ENGINEERING
690.5
C76

	Route to	See page
1		
2		
3		
4		
5		
6		

Contractors and Engineers Monthly

Vol. 43, No. 1 JANUARY, 1946 $3 a Year, 25 Cents a Copy

LIBRARY
FEB 5 1946

Covering the Field

- **Airport Construction**
  The grading and placing of bituminous-concrete paving on a macadam base for three runways in the expansion of the Ohio County, W. Va., airport are described on page 1.
- **Trestle for Skiers**
  The famous Mt. Cranmore Skimobile has been reconstructed, with a new treated-wood trestle on concrete footings, as well as additional club facilities. See page 1.
- **Four Grading Contracts**
  Practically every type of grading problem, including rock, side-hill cuts, and muck, had to be met on four contiguous contracts for 10 miles of new four-lane highway in the Pacific Northwest. See page 1.
- **Concreting a 13-Mile Tunnel**
  A comparison of the methods used by the two contractors for concrete-lining the Alva B. Adams Tunnel through the Continental Divide appears on page 2.
- **Soil Conservation Work**
  The opportunities for contractors in the vast program of soil conservation, and how to make the most of them, are discussed on page 6.
- **Year-Round Maintenance**
  A highway-maintenance program, involving seal-coat and plant-mix resurfacing done mostly by contract, is described on page 17. In the battle with snow, one state uses both highway design and a well organized snow-plowing procedure to keep roads open (page 37).
- **County Road Work**
  The use of local shale and chat has made possible low-cost road improvement for one rural county (page 29). The replacement of wooden bridges with concrete pipe in another county has proved economical in both construction and maintenance (page 65).
- **Bituminous Paving**
  The well laid-out plant for a bituminous-resurfacing job is described on page 41. Another hot-mix job, involving the widening as well as resurfacing of a considerable mileage, is covered on page 59.
- **Six Concrete Bridges**
  On a 16-mile highway reconstruction job, six reinforced-concrete bridges were constructed by two contractors, despite floods and labor shortage. See page 47.
- **New Type of Road Joint**
  On a recent concrete-paving project in New Jersey, a new type of expansion joint without dowels, consisting of a wood joint resting on a concrete sill in the subgrade, was used. See page 54.
- **Levee Construction**
  Draglines and a dredge were used to build a new 1,500,000-cubic-yard levee along the Mississippi (page 93).

(You will find "In This Issue" on page 4)

The Skimobile up Mt. Cranmore at North Conway, N. H.

New Trestle Built For Ski Tramway

Pull Material Up Grade Of 20 Per Cent; Improvement Includes New Clubhouse At North Conway, N. H.

✦ MOVING construction material up 20 per cent grades on the lower slopes of Mt. Cranmore is one of the problems confronting the George A. Fuller Co. of New York City in the erection of a new trestle for the Skimobile tramway at North Conway, N. H., skiing mecca of the east. Well known to winter-sport enthusiasts in the northeast snow lands since it was erected seven years ago, the Mt. Cranmore Skimobile tramway had been carried on a wooden trestle constructed in two sections. Beginning at the foot of the mountain, the lower section runs 2,800 feet, measured on the slope, with a vertical rise of 760 feet and a maximum grade of 20 per cent to the half-way mark, from which point the

(Continued on page 89)

Bituminous-Concrete Runways on Macadam

Grading, Paving Completed At Ohio County Airport Using Slag for Insulation, Macadam Base, and Hot-Mix

✦ WITH the recent completion of the grading and flexible-pavement construction of the three runways on which work was started in 1939 by the WPA, the Wheeling, W. Va., Ohio County Airport is now in service. Two contractors, A. S. Wikstrom of Bound Brook, N. J., on the grading, and the Warren Bros. Roads Co. of Cambridge, Mass., on the paving, lengthened and widened the partially finished runways under the direction of the Civil Aeronautics Administration, which stepped in to relieve the financial problem at the airport, and to make possible, in April, 1945, the resumption of work after a three-year period of idleness.

Located in rough terrain typical of West Virginia, the new airport lies 60 miles southwest of Pittsburgh on a 750-acre site which was formerly rolling farm land approaching marginal character. Two miles to the west are three paralleling lines of communication, concrete highway State Route 2, next a single-track branch of the Pennsylvania Railroad, and beyond that the Ohio River flowing south through the panhandle country. At this point the elevation of the river is 626 while the average elevation at the airport is 1,170. The 544-foot difference in elevation is a distinct advantage, for often when the river valley and the city of Wheeling, located on the Ohio, 12 miles to the south, are fog-bound with a zero ceiling, visibility at the airport is unlimited. According to CAA engineers, the ratio of fogs in the valley to the airport is 15 to 1.

Another benefit from the airfield's hilltop position is that when planes take off from the runways they almost immediately have acquired an altitude of several hundred feet, an appreciable factor of safety with heavily loaded ships. The absence of obstacles on the horizon insures a 40 to 1 glide angle at all approaches to the field.

Runways

The two major runways, No. 1 and No. 3, form an X, with runway 1 laid out from SW to NE, and runway 3 from SE to NW. Runway 2 is located across the top of the X in an east-west direction. The north end of the field is in Brooke County while the remainder, and larger portion, is in Ohio County, which was the original sponsor of the airport. Runway 1, which is used most since the prevailing winds blow up the river valley from the southwest, is now 5,000 feet long x 150 feet wide, having been enlarged in this last contract from a length of 3,300 feet and a 100-foot width. Runway 3, the other leg of the X, is 4,500 feet long and also 150 feet wide; before the 1945 construction its dimensions were 2,700 x 100 feet. No work was done on runway 2 which is 3,200 x 100 feet.

The runways have a sub-base of selected granular material, 10 inches thick, which was increased to 14 inches for the last 500 feet at each end of the runways. An insulation course of slag chips was placed on top of this sub-

(Continued on page 77)

Grading Problems Are Varied On Four Contiguous Contracts

Deep Earth Cuts, Presence of Rock, High Embankments, Bleeders for Muck Hole on 10 Miles of 4-Lane Highway

✦ FOUR contiguous grading contracts, awarded by the Washington State Department of Highways, for the construction of 10 miles of four-lane highway north of Vancouver on Highway 99, a strategic-network route between Portland, Oreg., and Seattle, Wash., illustrate very clearly the varying conditions which may be encountered in only a few miles of road building through the rugged coastal country of the Pacific Northwest.

The four contractors, Leonard & Slate Ltd. of Oregon, Portland, Oreg., Erickson Paving Co., Seattle, Wash., Strong & Macdonald, Tacoma, Wash., and Parker Schram Co., Portland, Oreg., equipped and staffed their jobs in accordance with the individual problems anticipated and made excellent progress despite shortages and the necessity of maintaining traffic.

Plans on all four jobs called for grading four 12-foot traffic lanes with a 4-foot dividing strip and two 10-foot shoulders on a 150-foot right-of-way. Fill slopes are variable from 1½:1 to 4:1, depending on embankment heights, and cut slopes were made 2:1 in earth, increased to 1½:1 in a few extra-deep cuts, with either 1:1 or ½:1 slopes in solid rock. The grading contracts included the placing of selected roadway borrow 4 to 7 inches thick, for which a pit-run material was used varying in size from sand to 6-inch-diameter gravel.

The Leonard & Slate Job

Starting from the south, the first section of this work was awarded to Leon-

(Continued on page 21)

LICES LABOR SHORTAGE

C. & E. M. Photo

Because of the acute labor shortage, Contractor T. H. Pearce, a former Auburn football tackle, was frequently found operating the Jaeger mixer or pushing a wheelbarrow of concrete to the forms on his bridge contract in Alabama (Page 47).

Concreting a 13-Mile Tunnel

Methods of Two Contractors On Colorado Reclamation Job

Variations in the Use of Equipment by S. S. Magoffin And Stiers Bros. on Same 9.75-Foot-Diameter Tunnel

By RICHARD J. WILLSON, Concrete Engineer, Colorado-Big Thompson Project

(Photos on pages 52 and 53)

✦ THE Alva B. Adams Tunnel, a part of the Bureau of Reclamation's Colorado-Big Thompson Project in northeastern Colorado, and the longest tunnel in the United States to be drilled from only two headings, is now being lined with concrete.

Drilling of the 13.03-mile perfectly straight transmountain water-diversion tunnel has been previously described in CONTRACTORS AND ENGINEERS MONTHLY (December, 1942, page 2). The tunnel, which passes under the Continental Divide between Grand Lake on the western slope and Wind River some 6 miles southwest of Estes Park on the eastern slope, was begun in June, 1940, and "holed through" in June, 1944. A delay of nine months occurred in the excavation work because of material shortage, a direct result of the war. The tunnel was excavated as nearly as possible in circular section to minimum dimensions of 11.75 feet in unsupported ground and 12.75 feet in supported ground. When lined with concrete, the tunnel will be circular and have an internal diameter of 9.75 feet. Not being a pressure structure, no reinforcement is employed other than that provided by the embedded steel supports. It has a designed capacity for gravity flow of 550 cfs and slopes from west to east 0.155 foot per 100 feet, making a difference of 107 feet in portal elevations.

The lining now under way is being done by contract under the supervision of the Bureau of Reclamation. The work is divided into two separate contracts; the eastern half of the tunnel is being lined by the S. S. Magoffin Co., of Englewood, Colo., and the western half by the Stiers Bros. Construction Co., of St. Louis, Mo. The lining is placed in two operations. The bottom 86 degrees comprises the invert portion and is placed first. The balance, comprising the arch and side-wall lining, is placed in the second and final operation.

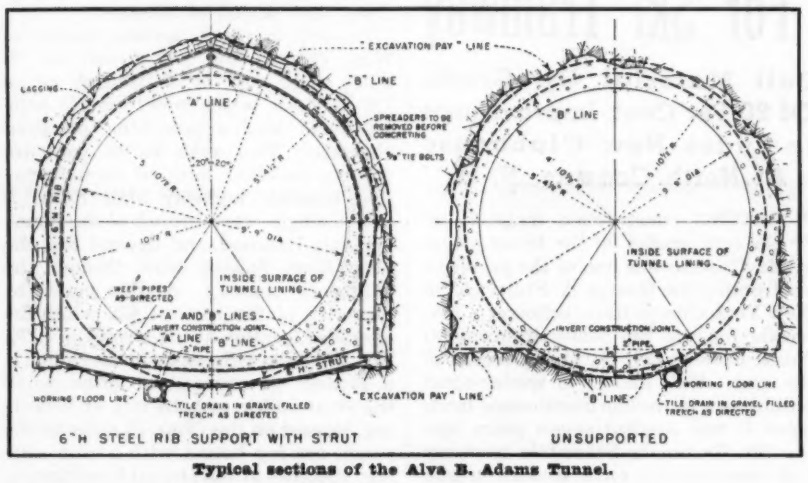
Lining Equipment

Equipment employed by the two contractors in the lining work is, for the most part, identical. It was designed for this particular operation and is somewhat novel. The contractors, the Ray Corson Machinery Co., the C. S. Card Iron Works of Denver, Colo., and the various equipment manufacturers cooperated in the final design, in which the length of the tunnel and its small diameter were the controlling factors.

Batching plants erected by the contractors were furnished by the Blaw-Knox Co. for the east portion of the work, and the C. S. Johnson Co. for the west portion. Cars for transportation of concrete materials into the tunnel were manufactured by the C. S. Card Iron Works, and were fabricated for mounting on the chassis also employed for mounting dump-car bodies used during the tunnel excavation.

The handling, mixing, and placing equipment was manufactured by various concerns and assembled by the C. S. Card Iron Works. The conveyors were furnished by the Barber-Greene Co. A Ransome 1-cubic-yard non-tilting type mixer was purchased by the S. S. Magoffin Co. for its portion of the work, and a Rex mixer of similar type and capacity is used by the Stiers Bros. Construction Co. Both contractors employ Model 200 Pumpcrete machines for delivery of concrete to the forms. These machines are similar in construction, except that the one used on the west end is the conventional double-valve type and that on the east end is an experimental single-valve machine. Two Pumpcretes were purchased by each contractor in order to have a standby unit.

A Blaw-Knox arch and side-wall form assembled and ready for movement into the tunnel.



Typical sections of the Alva B. Adams Tunnel.

Wooden forms were employed in the placement of the invert lining on the east side and 6-inch steel paving forms on the west side. Arch and side-wall forms used by both contractors are identical and were furnished by the Blaw-Knox Co.

Aggregates

Aggregate for use in the concrete lining of the western half of the tunnel is a natural sand and gravel obtained from a river deposit of the Colorado River, about 4 miles downstream from the west portal of the tunnel. It was processed in advance of concrete operations into three sizes: sand, 0 to 3/16-inch; 3/16 to ¾-inch gravel; and ¾ to 1½-inch gravel, and stockpiled pending use.

Aggregate for the east portion of the tunnel lining is now being processed from a deposit on the Big Thompson River, ¾ mile east of Estes Park, Colo. Originally the aggregate was processed into three sizes similar to that on the west side. However, the preponderance of elongated flat particles, a result of crushing cobbles and large boulders, made it necessary to reduce the maximum size to 1¼ inches. The larger-size coarse aggregate is therefore ¾ to 1¼ inches.

Aggregate for use in the tunnel lining work on the east end is loaded from stockpiles by an Athey MobiLoader mounted on a Caterpillar D4 tractor. Transport to the tunnel batching plant is by 4 and 5-cubic-yard end-dump trucks.

Cement

A modified Type II portland cement is used in the tunnel lining. The Colorado Portland Cement Co. is furnishing the cement for the work at the east end of the tunnel from a mill located northwest of Fort Collins, Colo. The Monolith Portland Cement Co. of Laramie, Wyo., supplies cement for the western half.

Cement for the eastern portion of the work is transported in bulk by truck 60 miles from the mill to the batching plant. On the west side, the cement is shipped in bulk by rail from Laramie, Wyo., to Granby, Colo. There it is unloaded into a 1,500-barrel storage silo from which it is trucked 16 miles to the west-portal batching plant.

Trucks employed in the transportation of cement on both sides of the divide are similar and consist of a standard dump bed, equipped with specially designed water-tight covers. The trucks have an average capacity of 12,000 pounds or approximately 32 barrels.

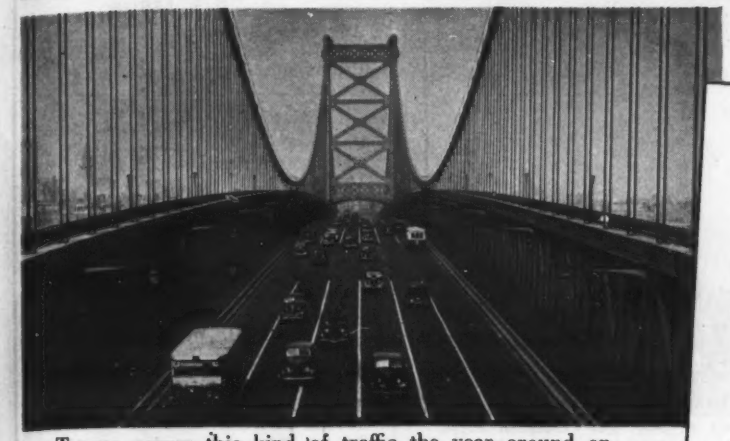
Batching Plants

The batching plant at the west portal is hexagonal in plan with a circular cement batching bin in the middle surrounded by the aggregate bins. The plant was erected directly over the tunnel portal and all batched materials for this reason are always out of the weather. Aggregate and cement delivered by truck to this plant are dumped directly into the batching bins.

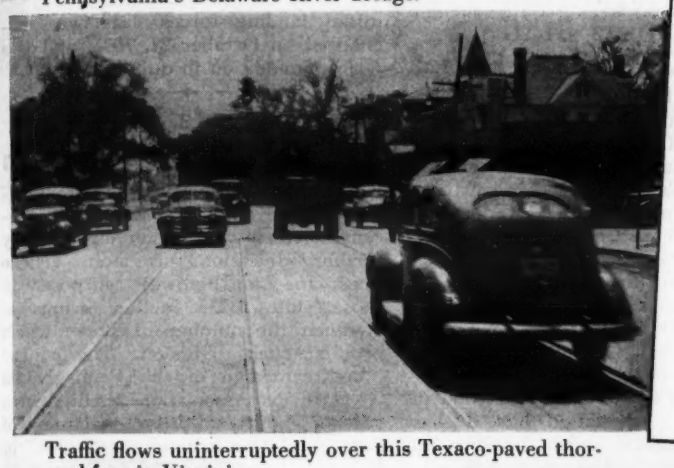
The plant at the east portal is in reality two structures, one for the batching of aggregates and the other for cement, and is located some 1,000 feet

(*Continued on page* 31)

This assembled handling, mixing, and placing "string" was specially designed for the concrete-lining operations on the Alva B. Adams Tunnel.



Texaco serves this kind of traffic the year around on Pennsylvania's Delaware River bridge.



Traffic flows uninterruptedly over this Texaco-paved thoroughfare in Virginia.

Texaco Asphalt under heavy State Highway traffic in Ohio.

This busy industrial street in Kansas is Texaco-paved.

For your heavy-traffic street or highway

there is no better pavement than resilient heavy duty ASPHALT

Holding its own under heavy, punishing traffic is an old story for resilient Texaco Asphalt paving.

For 40 years, engineers have been constructing Texaco Plant-mixed and Penetration Macadam pavements on heavily travelled State and County Highways and City Streets.

Not a few engineers here and there, but street and highway officials all the way from the Atlantic Seaboard to the Rockies have called upon Texaco to serve traffic totalling as high as 25,000 to 50,000 vehicles a day.

After years of economical service, an old Texaco pavement may be given a new lease on life at low cost by the addition of another layer of the same type of Texaco construction originally employed. The new surface forms a tight, durable bond with the original pavement.

Texaco Engineers who are Asphalt specialists will be glad to discuss your paving problem with you. Write our nearest office.

THE TEXAS COMPANY, *Asphalt Sales Dept.*, 135 East 42nd St., New York City (17)

Boston (16) Chicago (4) Denver (1) Houston (1) Jacksonville (2) Philadelphia (2) Richmond (19)

TEXACO ASPHALT

466446

Contractors and Engineers Monthly

THE NATIONAL BUSINESS PAPER FOR CIVIL ENGINEERING CONTRACTORS AND HIGHWAY ENGINEERS AND COMMISSIONERS

Member of Controlled Circulation Audit

Issued Monthly by Buttenheim-Dix Publishing Corp.

Editorial and Business Office: 470 Fourth Ave., New York 16, N. Y.

Acceptance under the Act of June 5, 1934, at Mount Morris, Illinois, authorized March 26, 1945.

Theodore Reed Kendall, Editor

Raymond P. Day, Western Field Editor — William H. Quirk, Eastern Field Editor

Olive E. Potter, Managing Editor

Edgar J. Buttenheim, President — Donald V. Buttenheim,* General Manager

George S. Conover, Vice President — Herbert K. Saxe, Treasurer

Myron MacLeod, Advertising Manager

BRANCH BUSINESS OFFICES

Chicago 6, Ill., Daily News Bldg., George S. Conover, Vice President; John T. Dix

San Francisco 4, Calif., Mills Bldg., and Los Angeles 13, Calif., Pershing Square Bldg., Duncan A. Scott & Co.

* On leave of absence for military duty.

Copyright 1946 by Buttenheim-Dix Publishing Corp.

A Cure-All for Traffic Accidents?

A National Committee for Traffic Safety has been meeting in Washington at the behest of the President to see what can be done to check the rapid rise in traffic accidents which jumped 27 per cent in the first 15 days after gas rationing was abolished. It is still increasing. Even in the days when only B and C-card drivers plied our highways, the traffic casualties were three times the battle casualties on all fronts.

There are earnest pleas for the design of safer highways. Highway engineers know the answer and have designed divided highways with grade separations and with means to keep the pedestrian away from motor traffic. But still the traffic accident toll rolls up!

Years ago we heard a heated discussion between two prominent traffic engineers as to whether trucks and passenger cars should be equipped with governors to limit the maximum speed of each vehicle. One maintained that governors are essential to reduce speed, the major cause of traffic accidents. The other pointed out that governing maximum speeds of trucks means holding the engine speed to a definite figure so that when a truck starts to climb a hill and the gears are shifted into low, it crawls at a snail's pace, creating a potential traffic hazard on hills. On the other hand, the limiting of the speed of a passenger car may be the cause of an accident because many times a burst of speed for a few yards prevents a crash.

It is our feeling that the governors belong in the heads of the drivers of motor vehicles. They can be placed there only by education and more education, and made to stick by adequate police and court action. The very fact that B and C-card drivers had such a heavy toll of traffic casualties when they had the streets and highways to themselves is proof that, in large measure, accidents are caused by the actions of drivers. Let us see to it, through school, community meetings, and compulsory lectures for all drivers if necessary, that the program of education is intensified to place those "governors" where they belong.

This plea does not mean that we would condone leaving a right-angle turn under a railroad, or at the bottom of a steep hill, and rely solely on education. There are still plenty of accident breeders in the sharp turns, narrow underpasses, and short sight distances on our highways to be corrected by the highway engineer on both primary and secondary roads. But engineers are doing something about those danger spots. What will be done in the way of education?

We still believe the best safety slogan for every automobile and truck driver is the one handed to us by the chap who taught us to drive on roads back of Albany, N. Y. When he felt we could manage the Model T without further instruction, he said, "Remember this, and you will never have an accident: Always be ready for the other damn fool!"

Research Fellowship

A research fellowship amounting to $600, to a graduate civil engineer interested in carrying on study for his Master's Degree, is available in the Department of Civil Engineering of the University of Utah. The work is primarily research, with good possibilities of expansion into a permanent position in the field, Professor A. Diefendorf, Head of the Department, says. Full details may be secured by writing him at the University, Salt Lake City 1, Utah.

Raymond P. Day, new Western Field Editor of CONTRACTORS AND ENGINEERS MONTHLY.

Seabee Joins Staff As C&E Field Editor

Raymond P. Day, who recently returned from service in the Pacific Theaters of Operation as a CCM with the Seabees, and whose articles on Seabee and Aviation Engineer construction have appeared in C&E MONTHLY and other construction papers, has joined our staff as Western Field Editor, succeeding Frank B. Sarles. Day is a Missouri man who has traveled far and wide working on construction projects in many parts of the United States, as well as overseas.

In addition to his early education in Chamois, Mo., his home town, he has studied journalism, and hydraulics and mathematics at the University of Southern California. His practical construction experience includes work with the U. S. Engineer Department on navigation and flood-control projects along the Missouri River; with Woods Brothers, contractor of Lincoln, Nebr.; and again with the U.S.E.D. on the Great Lakes Dredge & Dock Co. contract for dredging the Keweenaw Waterway at Houghton, Mich. Following this he went to California with the U.S.E.D., Los Angeles District, working on the Compton Creek Channel, Prado Dam, Sepulveda Dam, and Santa Fe Dam.

Day joined the Seabees on July 21, 1942, and after one month's training at Camp Bradford at Norfolk, Va., went to Trinidad with the 30th Construction Battalion, U. S. Navy. Following this he was transferred to the 301st Battalion, a group of 2,700 specialists in dredging and harbor work, which operated successively at Hawaii, Midway, Kwajalein, Guam, Tinian, Saipan, and Iwo Jima. This outfit's contribution to victory was the improvement of the harbors in these islands so that supply ships could move in to support the initial landing forces. He was discharged on October 27, 1945, and is a welcome addition to our field staff.

In This Issue

Aggregate Production 85
Airports 1
Bituminous Paving 17, 41, 59
Bridges 47
Concrete Construction 1, 2, 12, 47, 54, 65
County Road Work 29, 65
Culvert Construction 65
Dredging 93
Editorial 4
Equipment Shops 44
Flood Control 93
Grading 1
Highway Maintenance 17
Legal Decisions 73, 74
Levee Construction 93
Plans for Future Work 13, 25, 68
Portraits in Print 9
Reconversion Plans 13
Snow Removal and Ice Control 37
Soil Conservation 6
Trestle Construction 1
Tunnel Construction 2, 52, 53

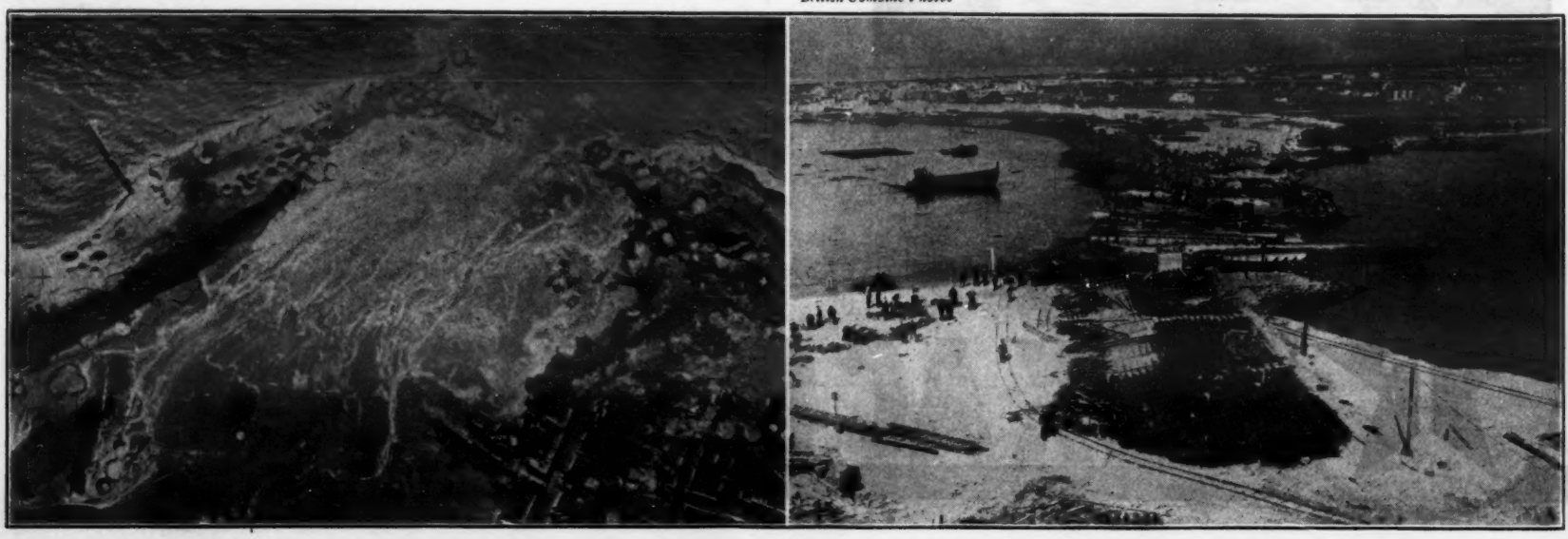
Amendments Prohibit Road-Fund Diversion

Amendments approved by Pennsylvania and Kentucky voters in the recent elections will effectively ban any further diversion of motor-vehicle taxes for non-highway purposes in those states. The action brings to eighteen the number of states which prohibit such diversion. The educational campaign of the Pennsylvania Good Roads Association resulted in a vote of about 7 to 1 for enactment of the prohibiting amendment, while in Kentucky, the Good Roads Federation produced a 4 to 1 vote in its favor.

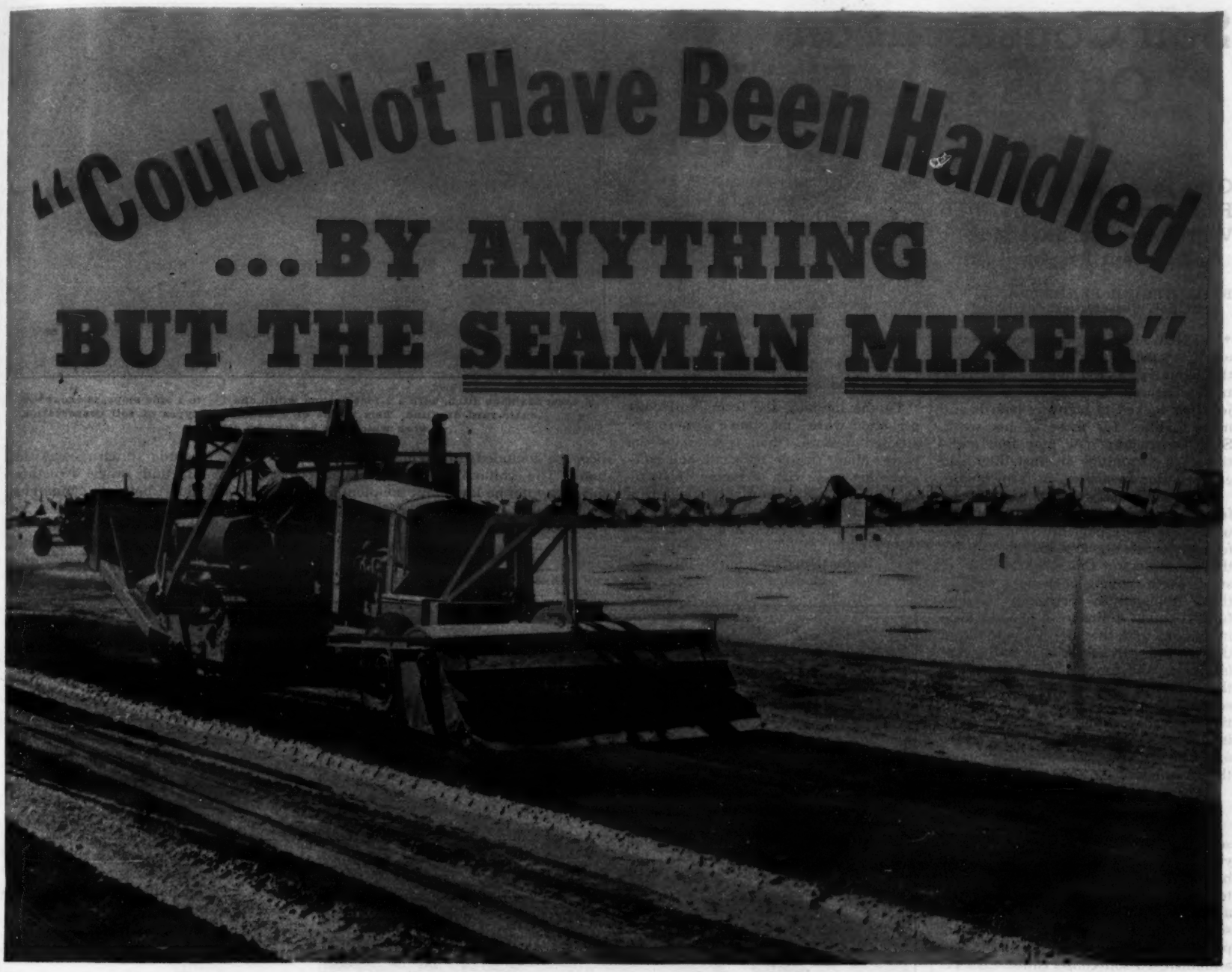
Anti-diversion constitutional amendments have been passed by the Legislatures of Indiana and Tennessee, but must be approved by the next session before being submitted to the voters. Texas has passed an amendment which will be submitted at the 1946 general election. Colorado, California, Idaho, Iowa, Kansas, Kentucky, Maine, Michigan, Minnesota, Missouri, Nevada, New Hampshire, North Dakota, Oregon, Pennsylvania, South Dakota, Washington, and West Virginia all now have anti-diversion legislation in effect.

Pennsylvania's action sets the pace for the other three great neighboring states of New York, Ohio, and Illinois, the National Highway Users Conference said, commenting on the amendment's passage. Sums amounting to $533,000,000 in New York, $122,596,000 in Ohio, and $68,826,000 in Illinois were diverted during the decade 1934-43. The magnitude of this misuse of highway funds is shown by the fact that in 1941, the last pre-war year, diverted funds totaled $219,039,000 nationally.

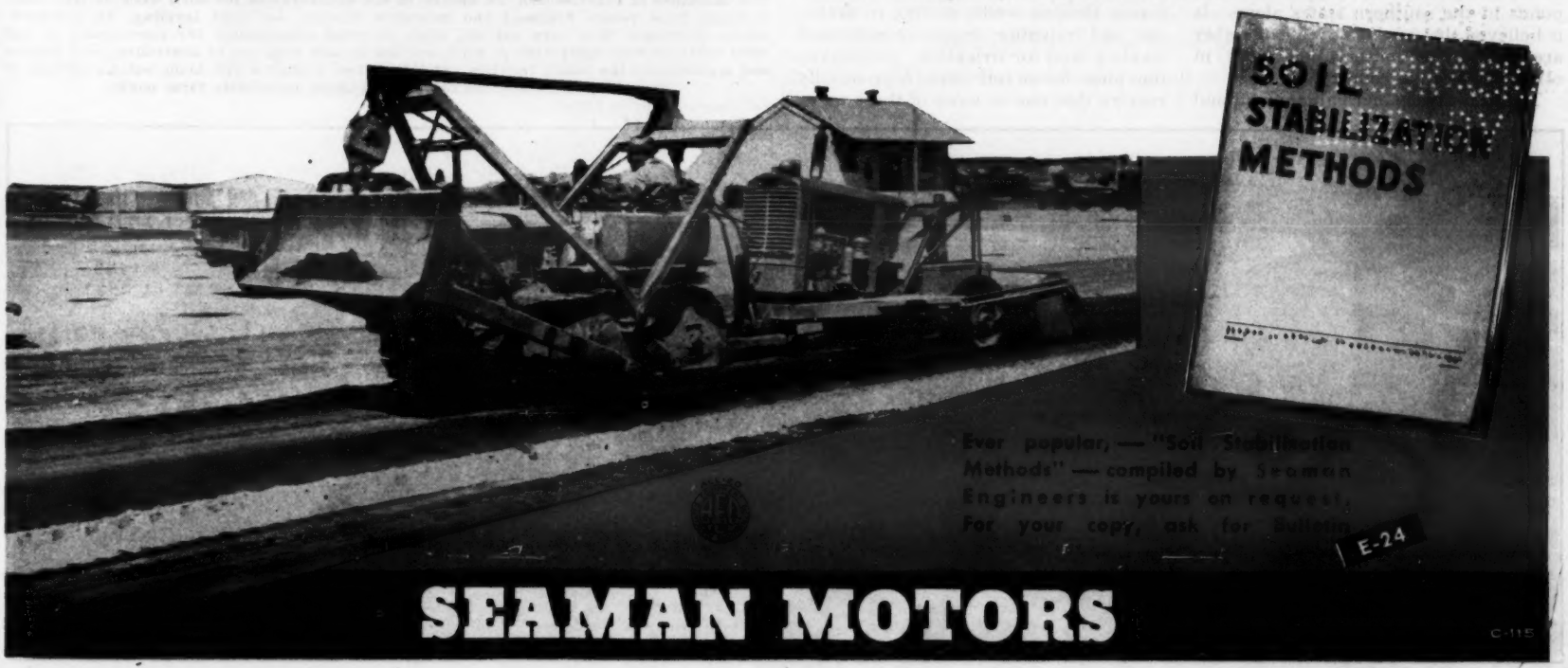
With the aid of British equipment, the Dutch are working like beavers on one of the primary reconversion tasks in the Netherlands—closing the Walcheren dikes which were breached by the British to inundate German defenses covering the port of Antwerp. Left, the seething waters of the North Sea pour through one of the bomb-made holes in the dike. Right, one of the breaches is nearly closed, with the flood water stretching for miles on the right. Six months of pumping will be needed to free the land.
British Combine Photos



"Could Not Have Been Handled ...BY ANYTHING BUT THE SEAMAN MIXER"



In constant use at the Almeda Airport, Alameda Naval Base, Oakland, California, are three SEAMAN MIXERS, — doing a difficult job of mixing bitumuls with sand dredged from Oakland Bay. The emulsion is made from 200-300 penetration asphalt, — and is applied in each pass at the rate of 1⅛ gallons per square yard. Four such applications (a total of 4.5 gallons) are mixed with the SEAMAN MIXERS, netting six inches of compacted depth. The sand is spread flat, — "shot" and immediately mixed in-place, — faster and less costly than windrow mixing. — This is a practice made possible with the SEAMAN — and one especially recommended for treatment of large areas. "Couldn't have been handled with the same dispatch and economy by anything but the SEAMAN", writes Louis F. Buran, Buran Equipment Company of Oakland, California.



Ever popular, — "Soil Stabilization Methods" — compiled by Seaman Engineers is yours on request. For your copy, ask for Bulletin E-24

SEAMAN MOTORS

C-115

Soil Conservation Offers New Fields For Contract Work

Growth of Program Calls For More Contractors Who Will Cooperate, Save Money, And Accept Responsibility

By DR. HUGH H. BENNETT, Chief, U.S. Soil Conservation Service

✦ A NEW field in soil conservation work is opening up for contractors in this country. Traditionally, the contractor geared to small earth-moving jobs has looked to highway boards and municipalities for most of his work. Such contractors now may find additional opportunities in installing soil conservation measures on farm lands.

This is private work to be done by farmers or groups of farmers, and it is usually their responsibility to arrange for contractor services and to pay for the job. Most of this work consists of small earth-moving operations such as those involved in terracing, building farm ponds, drainage ditching, farm irrigation, and the like. The bulk of the work is carried on seasonally, that is, during the times of the year when the land is not in crops, and consequently when other grading operations are slack. The engineering work is done in most cases by Federal or state agencies without cost to the farmer or the contractor.

Program Growing Rapidly

The national program of soil conservation was started a dozen or so years ago. Since that time there has been a marked expansion in farmer interest and in the amount of work done, although the surface has hardly been scratched. The big job is still ahead, principally in farmer-organized and administered soil conservation districts being formed at the rate of from fifteen to twenty a month over the country. Already, there are more than 1,400 of these districts, covering approximately 775,000,000 acres. They include 3,500,000 farms in more than 1,700 counties, or more than half the farm land of the United States.

Some contractors already are engaged in this soil conservation work. Accurate records of the number so employed are not available, but information which we have indicates that last year approximately 1,000 contractors were engaged in the construction of terraces and farm ponds in the southern states alone. It is believed that an even greater number are doing soil conservation work in other parts of the country.

The importance and value of soil and water conservation are generally known and accepted. The stage is now set for action in applying the practices to the land, especially as post-war development programs come into their own. Of first importance to the contracting industry is a knowledge of the kinds of work needed, the probable volume of such work, and the organizations and individuals with whom contractors may deal.

Type of Work Required

To the layman, the term "soil conservation work" may have a more restricted meaning than is actually the case. Many people associate soil conservation only with terracing or stripcropping or some other individual farming practice. Actually, soil and water conservation includes many practices used either individually or in combination. To those engaged in this program, the term "soil conservation work" includes all of those practices necessary for bringing about proper use of the land, controlling soil erosion, conserving needed water and soil moisture or disposing of surplus water, and maintaining the soil's fertility. Land drainage and farm irrigation are included.

Soil Conservation Service Photo

A farm drainage ditch, with a 2-foot bottom width and 1½ to 1 side slope, is excavated by a ⅜-cubic-yard dragline. This is one of a number of types of soil conservation work which can be done by contract.

Soil Conservation Service Photo

Thousands of concrete structures such as this flume crossing an arroyo are needed in the soil conservation program.

Those farm practices which readily lend themselves to construction by contract include building terraces, diversion ditches, outlet channels, and farm ponds; drilling wells; putting in drainage and irrigation improvements; and leveling land for irrigation. Conservation plans for an individual farm usually require that one or more of these practices be included, involving construction. The volume of work on each farm may not be large, but the planning of a number of farms in a given area often builds up a sizable volume of work that may be inviting to the contractor. The assistance furnished to soil conservation districts by the U. S. Soil Conservation Service further aids in building up a sufficient volume of earth-moving work to be attractive to contractors.

In addition to the individual farm conservation work, it often is necessary to construct or rehabilitate drainage and irrigation systems involving a group of farms. Such group jobs offer a greater volume of work per contract and may include ditch excavation, bridges, dams, and other structures. This distinction between individual farm and group jobs is important, because the contractor deals with the individual farmer in one case and with a group of farmers organized into a legal drainage or irrigation enterprise in the other. In many cases, these group jobs have been carried out successfully by informal mutual organizations.

Volume of Work

During the past year, the Soil Conservation Service alone assisted with the construction of 53,700 miles of terraces, 15,254 farm ponds, drainage improvements on 203,000 acres, and irrigation improvements on 224,000 acres. Some 66,000 acres were leveled for irrigation. In addition, 271 group drainage enterprises were completed, involving 513 miles of ditches and benefiting 2,515 farms. It is estimated that at least 100,000 miles of terraces and 50,000 farm ponds were installed last year under various programs. Contractors did a portion of this work.

Farm ponds accounted for approximately 80,000,000 cubic yards of earth excavation in the southern states during the year ended December 31, 1944, according to the report of the Agricultural Adjustment Agency. Of this amount, contractors moved at least 74 per cent, or more than 59,000,000 cubic yards.

Some idea of the extent of the conservation work needed in the United States is indicated by a recent survey made by the Soil Conservation Service. This survey shows a need for an estimated 19,500,000 acres of new drainage improvements and 9,500,000 acres

(*Continued on page* 100)

The machines of construction are needed in soil conservation for such work as terracing, building farm ponds, drainage and irrigation ditches, and land leveling. In localities where programs have been set up, there is great opportunity for contractors to put their earth-moving equipment to work and aid in this vital job of controlling soil erosion and maintaining the land's fertility. At left, below, a tractor and blade build a system of four terraces; right, the familiar bulldozer constructs farm ponds.

Soil Conservation Service Photos

SCOOPMOBILE

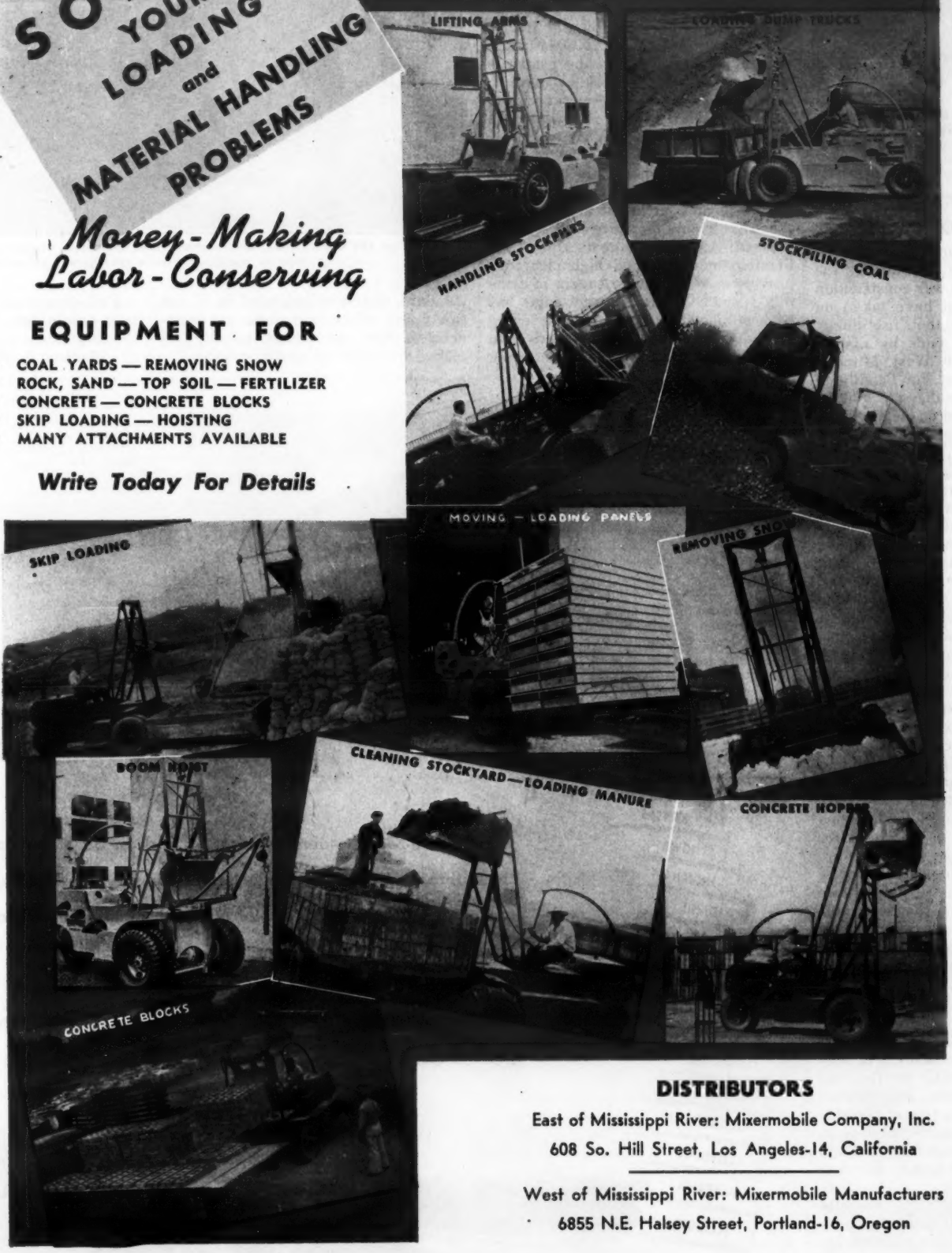
SOLVES YOUR LOADING and MATERIAL HANDLING PROBLEMS

Money-Making Labor-Conserving

EQUIPMENT FOR

- COAL YARDS — REMOVING SNOW
- ROCK, SAND — TOP SOIL — FERTILIZER
- CONCRETE — CONCRETE BLOCKS
- SKIP LOADING — HOISTING
- MANY ATTACHMENTS AVAILABLE

Write Today For Details



DISTRIBUTORS

East of Mississippi River: Mixermobile Company, Inc.
608 So. Hill Street, Los Angeles-14, California

West of Mississippi River: Mixermobile Manufacturers
6855 N.E. Halsey Street, Portland-16, Oregon

SCOOPMOBILE DEALERS

Western:

Loggers & Contractors Machinery Co.,
Klamath Falls, Ore.

Pacific Hoist & Derrick Co.,
3200 4th Ave., South, Seattle 4, Wash.

Andrews Equipment Service,
126 S. Walnut St., Spokane 9, Wash.

Capitol Tractor & Equipment Co.,
P.O. Box 928, Sacramento 4, Calif.

Rhodes & Jamieson, Ltd.,
333 23rd Ave., Oakland, Calif.

Intermountain Equipment Co.,
Broadway & Myrtle Sts., Boise, Idaho

Arnold Machinery Co.,
153 W. 2nd South, Salt Lake City 1, Utah

Neil B. McGinnis Co.,
P.O. Box 3615, Phoenix, Ariz.

Mixermobile Company of Colorado,
B. K. Sweeney Bldg., Denver 4, Colo.

Hall-Perry Machinery Co.,
Butte, Mont.

Hardin & Coggins,
1717 N. 2nd St., Albuquerque, N. Mex.

Mixermobile Sales Co. of Southern Calif.
2821 Mission Road, Alhambra, Calif.

Middle West:

Anderson Equipment Co.,
616 Merchants National Bank Bldg., Omaha, Nebr.

Victor L. Phillips Co.,
1600 Baltimore St., Kansas City 8, Mo.

Victor L. Phillips Co.,
1222 W. Main St., Oklahoma City, Okla.

O. B. Avery Co.,
1325 Macklind Ave., St. Louis 10, Mo.

Sterling Equipment Co.,
554 Builders Exchange, Minneapolis 2, Minn.

Illinois Road Equipment Co.,
1310 East Jefferson St., Springfield, Ill.

Western Equipment & Supply Co.,
2233 Eleventh St., Rock Island, Ill.

Chicago Construction Equipment Co.,
13912 So. Halsted St., Chicago, Ill.

Boehck Equipment Co.,
2404 West Clybourn St., Milwaukee, Wis.

Reid-Holcomb Company,
370 So. Illinois St., Indianapolis, Ind.

Contractors Machinery Co.,
333 Midland Ave., Detroit, Mich.

Contractors Machinery Co.,
Grand Rapids, Mich.

The Blake Equipment Co.,
1550 West Mound St., Columbus, Ohio

H. P. Kelly Equipment Co.,
1179 Gilbert Ave., Cincinnati, Ohio

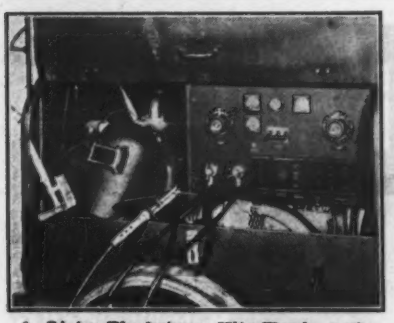
Contractors Machinery & Supply Co.,
128 So. St. Clair St., Toledo, Ohio

Hawkins Equipment Co.,
1475 Thomas Street, Memphis, Tenn.

EXPORT AGENTS

Howard E. Wagner,
100 East 42nd Street, New York 17, N.Y.

REEDER International,
100 Sacramento Street, San Francisco 11, Calif.



A Lister-Blackstone Nite-Hawk portable floodlighting unit may be fitted out with welding equipment, to increase its serviceability on construction jobs.

Expanding Services Of Portable Power

Portable floodlighting units which found such extensive use during the rush of night work on war construction are still available, but have taken on new services to expand their usefulness. The Nite-Hawk unit made by Lister-Blackstone, Inc., 6619 West Mitchell St., Milwaukee 14, Wis., for floodlighting is equipped with either a 5 or 7½-kw generator, mounted on steel wheels pneumatic tires, or skids, with four 1,000-watt floodlights. It is used on such special applications as tunneling, emergency repair of bridges, the floodlighting of any scenes of disaster, for lighting contractors' night work, etc.

There is now an increased demand for this unit as a portable power plant to furnish not only ac power, but also power for welding, air compressors, and floodlighting. Equipped in this manner, it becomes a valuable aid to contractors in the servicing of heavy equipment, it furnishes air for the inflation of tires, power for welding in case of breakdown, or for the operation of grease guns, and lighting for work at night. The power concentrated in a 5 or 7½-kw Nite-Hawk will operate quite a number of electric hand saws used in cutting forms, and when forms are stripped it furnishes power for finishing the concrete, as well as the light for pouring monolithic slabs which require work after dark. These portable power and light units also are used to operate portable drills, sanders, grinders, polishers, and all other kinds of hand tools requiring electricity.

Chicago Outlet for Rex

Western Contractors Supply Co., 3145 West Lake St., Chicago, has been appointed by the Chain Belt Co. of Milwaukee as a distributor for the Rex line of pavers, Moto-Mixers, Pumpcretes, and dewatering pumps. One of the oldest construction-machinery outlets in the area, the firm is headed by William Barrett, son of the founder, the late Tom Barrett.

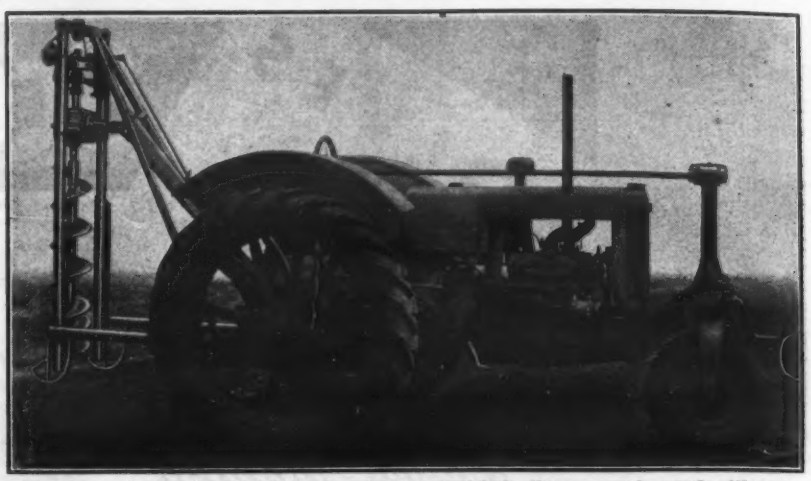
This equipment distributor recently completed a substantial expansion program, which includes new modern offices and display floor and enlarged service-shop facilities. Repair-parts stocks are to be maintained by the firm, which serves also as exclusive distributor for Ingersoll-Rand compressors and air tools in the Chicago area.

LANSING
WHEELBARROWS
CONCRETE MIXERS
DRAG SCRAPERS
Lansing Company
LANSING, MICH.
SINCE 1861

Power Hole Digger Is One-Man Operated

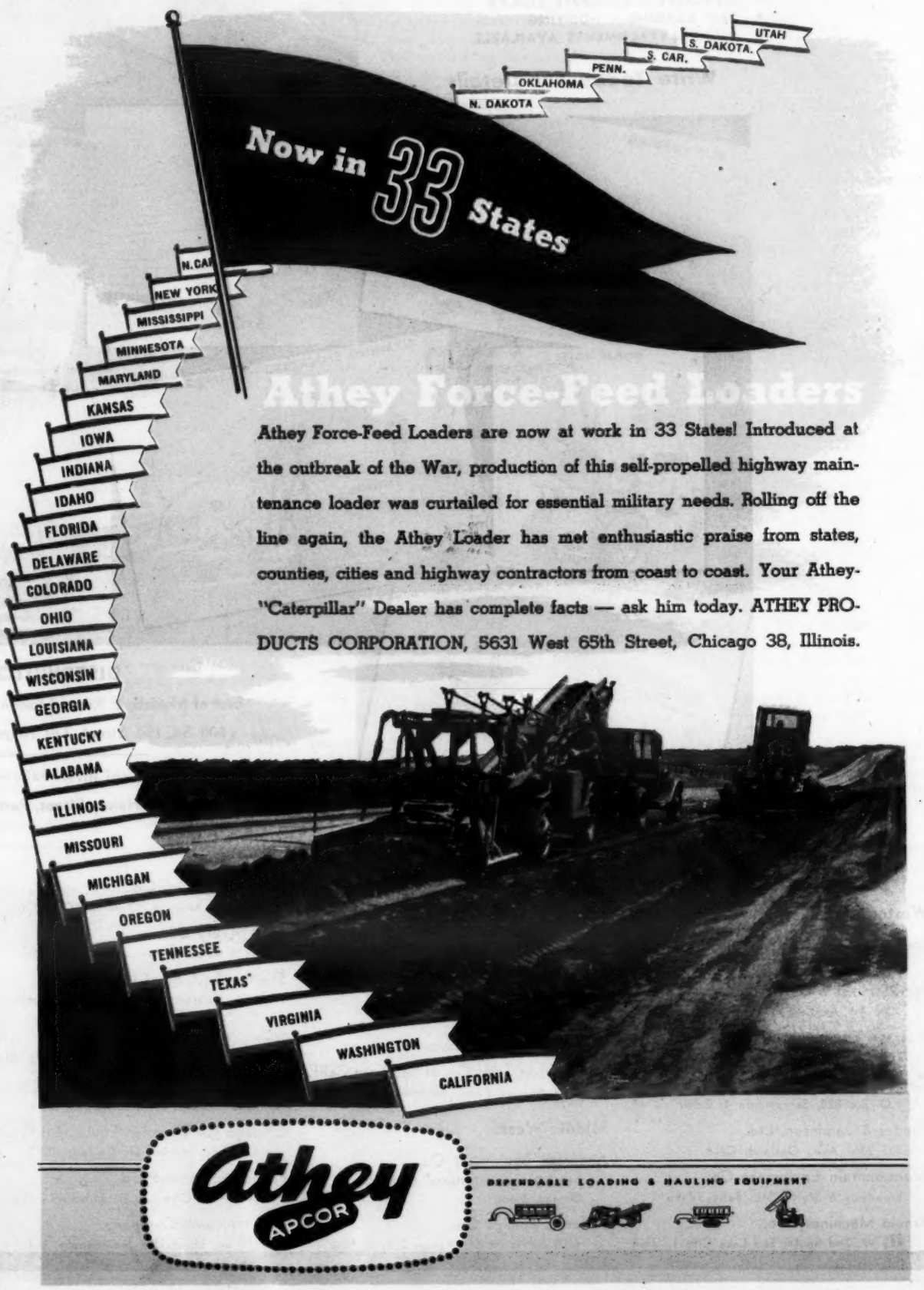
A new automatic post-hole digger, which may be attached to any tractor having rear-end power take-off, has been announced by the Equipment Sales Co. Known as the Continental, the device is operated by the tractor driver. It can bore holes 20 to 44 inches deep at any angle, from any grade on which a tractor can work.

All digging and raising operations are done by tractor power, and require a minimum of attention. A control lever permits stoppage at any time. Lifting by hand is eliminated, as the digger has an automatic power lift, which raises the blade and latches it at the top of the rig when the proper depth is reached. All enclosed gears run in oil. Flexible mounting and high clearance provide ease in travel. Augers of tempered steel, whose cutting edge has been subjected to a special hardening process, are available in diameters from 5 to 14 inches, the 9-inch size being standard. Safety is provided by a soft safety pin which will shear in emergencies. The machine is quickly attached or detached to the tractor.



Known as the Continental, this power-driven post-hole digger may be used with any tractor equipped with a rear power take-off.

Full details of this new Continental post-hole digger may be secured from the Equipment Sales Co., 16 No. Carroll St., Madison 3, Wis.



Portraits in Print

By BILL QUIRK

Contractor Visions Five-Day Week Soon for Construction Industry

✦ "IF the construction industry wants to attract labor, it must adopt the five-day week," vigorously asserted Michael A. Gammino of Providence, R. I., one of New England's foremost general contractors. "Labor, both common and skilled, is seeking jobs which will insure some leisure at the end of a hard work-week, and if we contractors do not realize that fact, the present shortage of workers in our industry is going to continue. Men who have been frozen in jobs demanding long hours on war contracts, and returning veterans who have had no choice of action under military discipline, now have the liberty to make a selection as to where they want to work, and they are exercising that right with great deliberation. One of the factors determining the choice they make is whether or not the job provides a five-day week. These men want to experience the joy of living and need a little time to themselves over the week ends after the long, arduous monotony of the war years, and they are going to get what they are after."

Rather a strange sight to see a contractor and a large employer of labor crusading for a shorter work-week in an industry that has ever been noted for its disregard of conventional hours of employment. M. A. Gammino, however, is a realist as well as a humanitarian and feels very strongly that the construction industry, together with the economic interest of business as a whole, will profit by the universal application of the five-day week.

"I disagree with those who say a seasonal industry like ours must keep going six and sometimes seven days a week if we expect to finish a job on time," Gammino continued earnestly. "Projects must be spread around, among more contractors if necessary, and in many instances the number of working days allotted to a contract can be increased without causing delay or inconvenience. To make up time we can use more equipment to offset the loss of not working Saturdays. By putting six shovels, for instance, on a grading job where we would ordinarily use only four, we could keep abreast of any specified work schedule.

"With a shortened work-week, more equipment will be needed, which will mean more jobs in the manufacturing industry; more contractors will be required, thereby stimulating competitive bidding and thus directly benefiting the private company or public-works agency for which the construction is being done. Some contractors, of course, may not be able to take on as many jobs at one time as they have been in the habit of doing, but spreading the work around will be a healthy thing for contractors as a whole.

"Incidentally," continued Gammino, "while I look for an increased number of contractors in this post-war period, I also expect to see a large number of strictly wartime contractors go out of business when they meet big-league competition. The easy days of forgetting about what a job is costing are past. From now on when a contractor makes a profit it is not a matter of course, but because he knows how to do the job from the inside out."

Labor as a Boy

The zeal for the five-day week evidenced by the founder and President of the M. A. Gammino Construction Co. stems from the realization of how hard and long he himself had to toil when as a boy of fourteen he worked for his father, Frank A. Gammino, who was a contractor in western Pennsylvania.

"I remember well," recalled Gammino, "how I got up at five o'clock mornings and often worked until ten at night for six and sometimes seven days a week on construction jobs. That doesn't make it right, though, and times have changed since then. The day of slave labor is past. Now an employee expects reasonable compensation for the number of hours he works, and the employer must realize he must satisfy labor if he wants to keep it. If he does not grant such concessions as the five-day week, the labor unions will soon demand it anyway and most likely will get it."

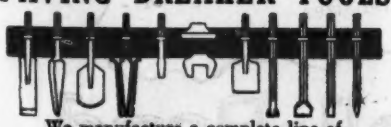
The plain, impassive countenance of Gammino becomes animated when he talks about his five-day-week goal for construction workers. Now approaching 57, he has reached a position where his words carry weight on this increasingly important subject, and he hopes to make that influence felt where it will do the most good. His discourse was

M. A. Gammino, founder and President of M. A. Gammino Construction Co., Providence, R. I.

interrupted by the ringing of one of the two telephones at his desk, and he

(Continued on next page)

"BICKNELL BETTER BUILT"
PAVING BREAKER TOOLS



We manufacture a complete line of tools for pneumatic paving breakers, rock drills and diggers.

Write for descriptive circular

BICKNELL MANUFACTURING CO.
12 LIME STREET ROCKLAND, MAINE

YOU'LL GET *MORE* OUT OF A *MULTI-PURPOSE* LORAIN!

CAREFUL job analysis shows that the vast majority of construction operations can be broken down into the seven basic work classifications shown below. Since no one can tell exactly which of these types of work—or combinations of them—your present or next contract will bring, the wisest investment is in equipment that can be adapted to every kind of work. And no other machines will fit into any and all classifications as well as multi-purpose Lorain Cranes and Shovels!

When you plan your next equipment purchase, look beyond the immediate job—consider the long range possibilities of what you buy. In stamina, in basic engineering and adaptability to every kind of work, Lorain Cranes and Shovels are designed to give you *years* of service on *all kinds* of jobs.

The five convertible and interchangeable front-ends shown actually give you five machines in one—an all-purpose outfit ready to cover the entire range of excavating, material handling and building jobs.

Ask your nearest Lorain distributor—or write us direct —for the facts and figures. Among the large and small crawler-mounted Lorains, rubber-tired Lorain Moto-Cranes and rubber-tired Self-Propelled cranes there's the right machine for your conditions. Let us help you pick the right one now for many future years of profitable service.

You can do all these jobs with one machine —A LORAIN!
DEEP EXCAVATIONS
WET BOTTOM JOBS
BANK, CUTS and SLOPES
CASTING
MATERIAL HANDLING
ROCK WORK
LIFTING SERVICE
Easily and quickly convertible to dragline, clamshell, shovel, backdigger or crane work, one Lorain will give you the same work range as several special purpose machines! Available on crawler or rubber-tired mountings.

Reg. Trade Mark
thew-Lorain
THE THEW SHOVEL CO.
Lorain, Ohio

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

Five-Day Work-Week Predicted by Gammino

(*Continued from preceding page*)

was brought back to the mundane problems of a contractor, requiring an alert grasp of a situation and a quick decision. That attended to, Gammino again relaxed and puffed a cigarette.

His full face has been reddened by the elements, but his forehead, protected by a hat, is a contrasting white. He is 5 feet 10½ inches tall, weighs 175 pounds, wears glasses, and combs his straight, iron-gray hair in a part on the side. He was born in the coal-mining town of Glen Lyon, Pa., where his father, an immigrant, was superintendent for a construction crew of the Pennsylvania Railroad. His father later started in the contracting business, first with a partner named Chaffe, but after a few years went in business for himself. The elder Gammino secured contracts that brought him eastward, first to New York for a paving job in Flushing, Long Island, and then to Providence, R. I., where his firm built a water works just before the turn of the century at the invitation of Samuel M. Gray, a consulting engineer for whom Gammino had done some work back in Pennsylvania. He pioneered particularly in the field of sewer construction and laid pipe all through New England during that era when nearly every town had a sewer to build.

Young Contractor

At the age of 19, young Michael Gammino forsook the parental wing to start his own contracting business, and for three years built sewers and did excavation jobs on a modest scale. In 1912 when some large projects were being promoted he rejoined his father and built the North Bedford intercepting sewer with pumping station and the Fitchburg, Mass., main trunk-line sewer. The taste he had of running his own business was too strong to forego, however, and in 1915 he incorporated the M. A. Gammino Construction Co., specializing in sewers, water works, heavy excavation and industrial-building construction. The fine contracting hand of Gammino was evident in practically all sewer work done in the busy industrial cities of Providence and Pawtucket at that time.

When no more sewers were needed, the highway program in New England was getting under way, and Gammino decided that the automobile had come to stay. In 1923 the company got its first contract for road building, and since then it has laid many miles of paving in Rhode Island, Connecticut, Massachusetts, and also New York, built numerous parkway bridges, and for variety has constructed a goodly length of dikes and sea walls along the stern Atlantic coast.

Despite the exhausting demands of this work on the time of a busy contractor, Michael A. Gammino was preparing for the technical side of such a career by studying architectural design at night at the Rhode Island School of Design and business administration at the old Rhode Island Commercial College. He also got married shortly after he first embarked in the contracting business, and has raised a family of six, one girl and five boys, of whom the older three are already carrying on the Gammino construction tradition.

Gammino Family

Frank, the eldest, is a strapping husky of 35, who was a fullback on the crack football team of 1932-33-34 at Brown University from which he was graduated with a civil engineering degree. He is now a family man with two sons and is General Manager of all the construction projects of the company. Tom, a 33-year-old bachelor just out of the Army, is another big, burly, ex-footballer who studied business administration and engineering at Brown and Notre Dame and is a Project Superintendent. For Superintendent of Equipment, the company has Byron, the third son, now 29 and the proud father of three girls. He attended Rhode Island State College and looks after the maintenance of the construction machinery and also its transportation as it is moved about from job to job.

All repair jobs on company equipment, which includes seventy-five trucks, are done at the two-story reinforced-concrete garage and machine shop on Valley Street, Providence, across the street from the general office of the company. The M. A. Gammino Co. occupies six buildings with 60,000 square feet of floor space at this location and also operates an asphalt plant and a ready-mix concrete plant on Earnest Street, Providence. The company also sells crushed stone from its quarry at Lincoln, R. I., and gravel from its three processing plants at Cranston and Slocum, R. I., and at Seekonk, Mass.

"My three oldest boys have really been in the business since they were youngsters," commented the senior Gammino with justifiable pride. "During summer vacations from high school they always worked on construction jobs, doing the work of a man and learning the business from the inside out. They have done everything from feeding a stone crusher up to superintending a job. I have always told them that they must know how to build a job themselves before they attempt to tell someone else what to do."

The three younger members of the Gammino clan who are not associated at present with the construction company are Marie, 27, married and the mother of two boys and a girl, and the two youngest sons, Michael Jr., 23, and Bob, 20. Michael Jr., who studied law at Brown, is awaiting his Army discharge, while Bob is still out in the Pacific area with the Marines. The latter went to prep school at La Salle Military Academy, Oakdale, Long Island, and expects to continue his studies in engineering when he is released from the service.

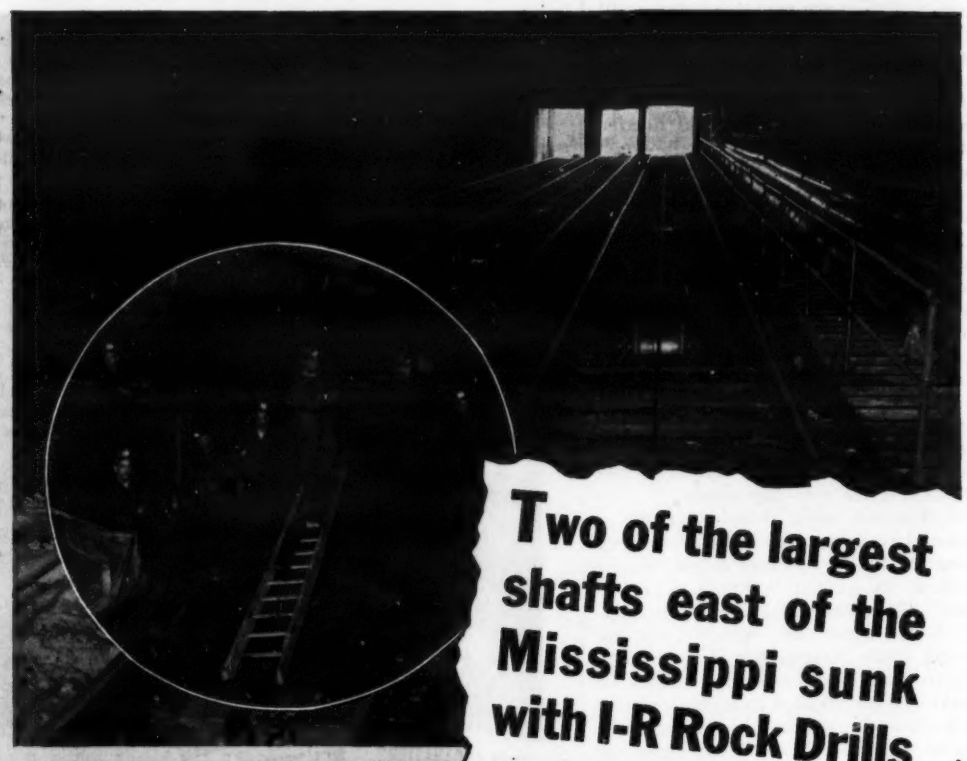
Hobby Lobby

With this dependable assistance coming from his three sons, Michael A.

(*Concluded on next page*)

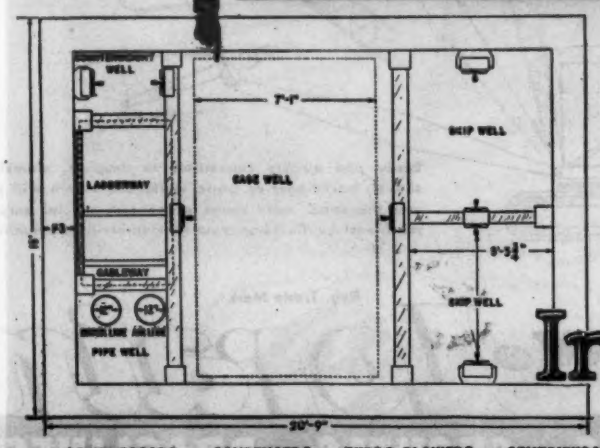
Main inclined shaft at a magnetite mine. Slope 33 degrees, height 9 feet 8 inches, width 28 feet 2 inches, and length 2000 feet. It will handle 9000 long tons of ore per day.

Insert shows DA-35 Power-Feed Drifters at work. Jackbits were used for all drilling. They were reconditioned with the JMA hot-mill and were reduced 1/16 inch in gauge.



DA-35 Drifters in the New Leonard Shaft of the Warren Foundry and Pipe Co.'s Mt. Hope mine. I-R Jackhamers were used in place of the drifters whenever the rock was soft.

Cross section of the New Leonard Shaft. Total depth of this shaft is 2674 feet, and it will handle at least 6000 tons of ore per day. Jackbits were used for shaft sinking and for drilling bolt holes in the concrete for the steelwork that divides the shaft.



Two of the largest shafts east of the Mississippi sunk with I-R Rock Drills and Jackbits

FAST DRILLING IS ESSENTIAL if the overall shaft-sinking time cycle is to be reduced. That is why the contractors on these two shaft jobs selected record-breaking DA-35 Power-Feed Drifters to do their drilling.

The Power Feed was specified because it provides faster steel changes. It gives the drill operator greater freedom and he is less fatigued at the end of the shift. There is no let-down in the rate of drilling. Forty different positions of the Power-Feed throttle permit the proper adjustment for any kind of rock.

Jackbits were used on both jobs since they enable drill runners to get the most out of their machines. Less steel was handled, and the proper design of bit for the local rock conditions was chosen from the wide range of Jackbit types and sizes.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 5-733

COMPRESSORS • CONDENSERS • TURBO BLOWERS • CENTRIFUGAL PUMPS • ROCK DRILLS • AIR TOOLS • OIL AND GAS ENGINES

VULCAN TOOLS

A complete line for every type of Rock Drill, Pavement Breaker and Clay Digger.

Vulcan Tool Manufacturing Co.

35-43 Liberty Street, Quincy 7, Mass.

Branch Offices and Warehouse Stock:

74 Murray St. New York 7, N. Y. — 34 No. Clinton St. Chicago 6, Ill.

Five-Day Work-Week Predicted by Gammino

(*Continued from preceding page*)

Gammino has the time to ride some of his hobbies which are remote from the field of heavy construction. On the walls of the company conference room, tastefully done in English walnut, are hung some large stuffed deep-sea fish, mute testimony of the veteran contractor's skill with the rod and reel. The war over, the Gammino cabin cruiser will again be plying the coastal waters of New England around Providence.

Another hobby which has progressed into a respectable-size business for Gammino is the raising of Holstein cattle on his 400-acre Broad Rock Farm at Peace Dale, R. I., where he and his wife live six months of the year, the rest of the time being spent at their home in Cranston, a suburb of Providence. He is a member of the National Holstein-Friesian Association of America and regretfully tells how he once paid $10,000 for a three-year-old Holstein-Friesian bull which died on him four months later. He has since refused $20,000, however, for another bull which cost only $5,600. His 150 head of cattle contain some of the choice breeding stock in New England.

In addition to his sporting activities and contracting business, which has employed 1,200 at peak periods, Gammino finds time to be Chairman of the Board of Directors and Executive Vice President of the Columbus National Bank of Providence and holds membership in such clubs as the Town Criers, Italo-American, Elks, Lions and Providence Engineering Society. He is also a Past President of the Rhode Island Road Builders' Association.

Contractor First

His foremost interest is, as it always has been, in the contracting business. The Gammino company is now constructing some reinforced-concrete sea walls along the coast, building a new race track outside Providence, erecting a parkway bridge in Connecticut, and submitting bids for road jobs in the lower tier of New England states.

"The future is bright for contractors, I think," said Gammino. "I expect to see so much work that there will not be enough contractors to go around. However, the cost of labor will continue to be high until the inevitable adjustments to post-war conditions come about. We can speed these necessary adjustments and help stabilize the construction industry by offering labor a tangible benefit like the five-day week. From my own viewpoint, our foremen and superintendents will be more efficient when the drain on physical resources from working too many hours in a week has been relieved.

"With all the problems, long hours, and hard work," Gammino continued in a philosophical vein, "I would not want to be anything but a contractor. It has been a stormy road but a pleasant one. We have experienced varying business cycles during the past three decades but have managed to weather the blows. During the war we had lean years when the volume of our business dropped 30 per cent below normal. I threw the suggestion to my boys that we sell our construction equipment, at a time when prices were favorable, and invest in some other enterprise. Their answer, as I expected, was 'no'. The contracting game has got its hold on them the same way that it has on me."

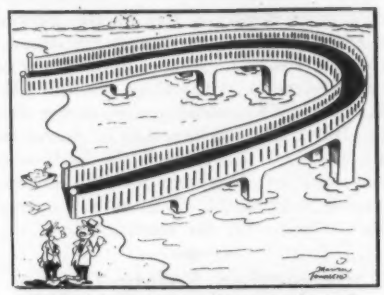
The M. A. Gammino Construction Co. has become as synonymous with New England as clam chowder or the boiled dinner. Whether the construction industry adopts the five-day week this season or not, Michael A. Gammino will probably not apply the rules to himself. He has been a contractor too long a time.

AED Faces Problems At Chicago Meeting

The charting of the organization's course for the coming year will occupy the 27th Annual Meeting of the Associated Equipment Distributors, to be held January 28-31 at the Edgewater Beach Hotel, Chicago. Surplus-property disposal, remaining wartime governmental restrictions, and the problems of future distribution will be considered by the assembly.

Nationally known leaders of thought in industry and government are scheduled to address the sessions, registration for which will be restricted to AED members. Special attention is to be given the association's program for providing "new and constructive opportunities for returning veterans".

H. O. Penn of New York, President of the AED, will preside at the four-day gathering. The program is being arranged by the program committee of which F. B. McBath, Portland, Oreg., AED Executive Vice President, is Chairman.



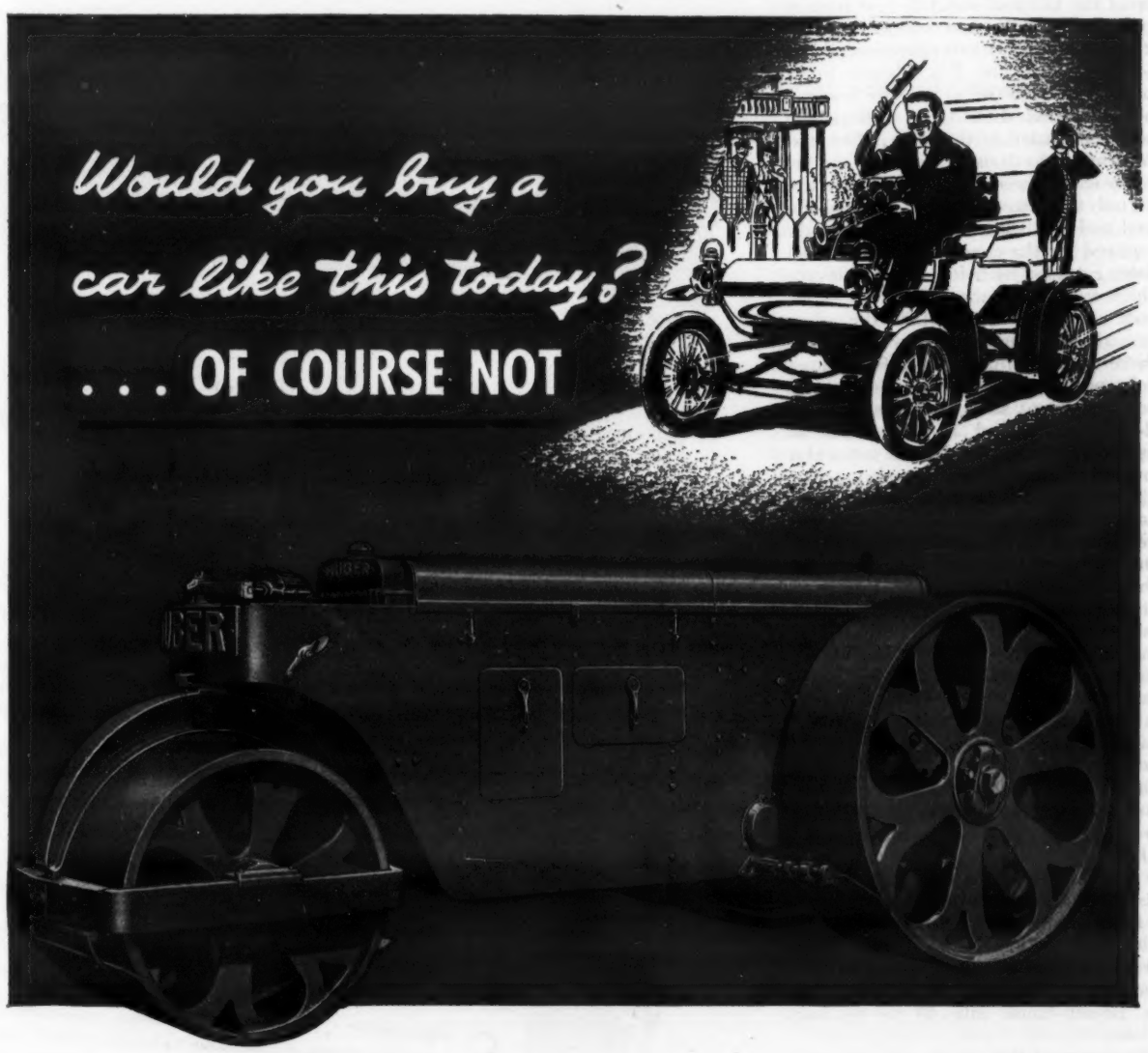
"This job cost more than we planned, so we had to turn back."

Marvel Studies SA Market

Ten South American countries are to be visited during a four-month business trip by Manuel Correa, Sr., Vice President and Export Manager of the Marvel Equipment Mfrs., Inc., Chicago.

In Mr. Correa's absence, his duties will be carried out by his son Manuel, who was released recently from his post as inspector of radio engineering with the Army Air Force. Another veteran, First Lieutenant Dick Herz, a cousin of the firm's President, has joined the organization. A graduate engineer, he served with the Tank Corps in the "Hell on Wheels" Division, in the European theater.

STOP WINTER DELAYS
Get Summer Efficiency with Aeroil
Concrete Heaters
Water Heaters
Salamanders
Thawing Torches
- ALSO -
... Kettles for Tar, Pitch and Asphalt ...
Emulsion Distributors ... Power Sprays ... Weed Burners
Lead Melting Furnaces ... Torches and Burners
Send for FREE Bulletin No. 1945
AEROIL PRODUCTS COMPANY
West New York, New Jersey
Chicago, Ill., San Francisco, Calif., Dallas, Texas



Just as 1946 motor travel calls for a modern automobile, today's construction job demands an up-to-the-minute roller— a HUBER HEVI-DUTY. Rugged, heavy solidness for the toughest punishment plus power and speed to spare — that's the HUBER HEVI-DUTY, available in 10 and 12 ton sizes. Let us tell you the whole story.

THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

HUBER ROLLERS

466446

Side-Hill Batching Proves Economical

J. C. Montag & Son, Contractor, Saves Aggregate Rehandling by Chuting All Material From Top of Hill to Plant; Mix and Chute to Forms

✦ A RATHER effective economical installation for batching concrete aggregates without excessive use of scarce man-power was observed at the power-house addition being constructed for the Bureau of Reclamation at Cove, Oreg., by J. C. Montag & Son, contractor of Portland, Oreg. Since the concrete was needed at the foot of a steep hill, gravity was utilized to minimize rehandling in proportioning the concrete batches and placing the concrete in the forms.

The Set-Up

Parallel to a road running along the top of the hill and about 20 feet from it both horizontally and vertically, 6 x 12-inch posts were erected vertically at 4-foot centers with 2 x 12-inch horizontal lagging nailed to the side towards the slope and their tops anchored to deadmen buried in the bank. Two end walls and two division walls of similar construction were erected to divide the bin into three compartments to hold the sand and two sizes of coarse aggregate required for the concrete. Sliding steel plates actuated by 6-foot wooden levers which could be reached from the operating platform controlled the flow through openings in the front bulkhead. Three wooden chutes, about 6 feet long and tapered from 24 inches wide and 12 inches deep at their upper ends to a 12-inch width and 12-inch depth at their lower ends, led from the gates at a downward angle of 45 degrees.

About 4 feet below the lower end of these chutes a horizontal platform was erected and in this platform, set flush with its upper surface, three Johnson wheelbarrow scales were spotted with their centers immediately under the centers of discharge from the chutes leading from the aggregate bin above. Another chute of dressed lumber was used to slide sacked cement from trucks on the upper road to storage beside a Koehring 14-S mixer on the same platform with the wheelbarrow scales. Water was supplied to the concrete mixer through a pipe leading from the forebay of the power house at an elevation sufficiently high to permit gravity discharge into the water tank of the mixer. At the edge of the platform and in front of and below the mixer a 28-cubic-foot bottom-dump hopper was set with a 6-inch elephant trunk to discharge the concrete into the forms at the power-house site 40 to 60 feet below.

By means of this simple batching and mixing system, a crew of six men, consisting of a concrete-mixer operator, one cement man, three wheelbarrow rollers who also operated the gates and weighed the aggregates in proper amounts into their wheelbarrows in place on the scales, and one laborer, were able properly to proportion by weight, mix, and deliver into the elephant trunk, concrete at the rate of approximately 10 cubic yards per hour, and at times 15 cubic yards an hour.

Personnel

The contract for the addition to the power house at Cove, Oreg., was awarded to J. C. Montag & Son of Portland, Oreg., and involved the placing of 1,700 cubic yards of concrete. Enlargement of the Cove plant is part of the work being carried on to provide irrigation water for 50,000 acres under the Deschutes Project, the first of which is to be made available next spring. Storage of water in one of the project's two reservoirs deprived the Pacific Power & Light Co. of water power for its existing plant and necessitated adding a new generator at the Cove plant. C. H. Spencer is Construction Engineer for the Bureau of Reclamation in charge of all work on the project. S. E. Kebbe was Resident Engineer for the Bureau on this work and C. C. Montag was Superintendent for the contractor.

Construction Safety Unit Chooses New Directorate

Lloyd A. Blanchard, Chief of the Safety and Accident Prevention Division of the Army Corps of Engineers, has been elected to succeed G. O. Griffin, Safety Director, Dravo Corp., as General Chairman of the Construction Section, National Safety Council. Mr. Griffin, leader of the group for two years, has been named a member-at-large.

Chosen as Vice Chairman of the body is Frank J. Crandell, Assistant Vice President of the Loss Prevention Department, Liberty Mutual Insurance Co. Harry J. Kirk, Safety Director of the Associated General Contractors of America, is the new Secretary. Edgar N. Goldstine has been renamed Editor of the Section's *News Letter*.

Committee chairmen elected are: Otto S. Holmskog, Employers Mutual Liability Insurance Co., Program Committee; Harold E. Sneed, DeWalt Products Corp., Engineering Committee; William G. Rapp, Bethlehem Steel Co., Visual Education; and Cecil L. Hightower, United Gas Pipe Line Co., Membership Committee.

In addition to Mr. Griffin, the following were elected members-at-large: Ray J. Reigeluth, New Haven Trap Rock Co.; W. A. Hazard, Bethlehem Steel Co.; Roy A. MacGregor, Secretary, Constructors Association of Western Pennsylvania; E. A. Blanpied, Kansas City Bridge Co.; C. H. Black, Stone & Webster Engineering Corp.; Thomas M. Webb, Bridgeport Brass Co.; George S. Wilhelm, Zurich General Accident & Liability Insurance Co.; Joseph DeLuca, E. I. du Pont de Nemours & Co.; D. T. Harkrider, Texas State Highway Department; and Floyd E. Frazier, National Surety Corp.

Robert L. Moore and Harold E. Dato of the National Safety Council are Staff Representatives.

Arc Welding Textbook

A helpful book for a contractor or highway shop to have as an aid to employees who are interested in broadening their activities by adding welding to their accomplishments is "Lessons in Arc Welding", recently reprinted by the Lincoln Electric Co. Practical instruction in plain language features the 61 lessons in arc welding in the 176-page volume. The work includes 133 illustrations, and 571 examination questions with answers.

Bound in semi-flexible simulated leather, the book may be purchased from the Lincoln Electric Co., 12818 Coit Road, Cleveland 1, Ohio. Price in the United States is 50 cents per copy.

Pedigree

CHRYSLER

Industrial Engines

"HORSEPOWER WITH A PEDIGREE"

CONCEPTION . . . BACK IN 1924, CHRYSLER INTRODUCED A NEW CONCEPTION OF THE INTERNAL COMBUSTION ENGINE — COMPACT, HIGH COMPRESSION, FLEXIBLE HORSEPOWER. TEN MILLION CHRYSLER-BUILT ENGINES PROVE THE VALUE OF THIS CONCEPTION.

HISTORY . . . FOR A FULL GENERATION CHRYSLER-POWERED VEHICLES, VESSELS AND EQUIPMENT HAVE ESTABLISHED NEW STANDARDS OF PERFORMANCE — A NEW EXCELLENCE OF QUALITY RESULTING FROM TIME-TESTED PRINCIPLES OF POWER APPLICATION.

RECORD . . . WITH BUILT-IN PRECISION AND ADVANCED ENGINEERING, CHRYSLER ENGINES HAVE DEMONSTRATED A STURDINESS AND STAMINA THAT MEET THE CHALLENGE OF DAY-IN, DAY-OUT, GRUELLING USE.

YIELD . . . CHRYSLER ENGINES IN THE COMMERCIAL, INDUSTRIAL, AGRICULTURAL AND MARINE FIELDS HAVE TURNED IN A PERFORMANCE THAT STAMPS CHRYSLER HORSEPOWER AS AN INVESTMENT THAT PAYS SUBSTANTIAL RETURNS IN DOLLARS AND CUSTOMER SATISFACTION.

SUPERIORITY . . . EACH FEATURE IN DESIGN, CONSTRUCTION AND WORKMANSHIP IN CHRYSLER ENGINES IS COMPARABLE TO THE OUTSTANDING QUALITIES PROVIDED BY THE CHRYSLER SUPERFINISH OF MOVING PARTS AND ALL WEARING SURFACES.

LONGEVITY . . . CHRYSLER ENGINES STAND UP OVER THE YEARS BECAUSE THEY POSSESS A METALLURGICAL FINENESS — FROM CRANKCASE TO CYLINDER HEAD — THAT OVERCOMES THE STRESSES AND STRAINS OF EXPANSION AND CONTRACTION.

ENGINEERING . . . OVER 2,000 TECHNICIANS IN THE GREAT CHRYSLER ENGINEERING LABORATORIES HAVE CONTINUOUSLY PIONEERED AND DEVELOPED FEATURES IN ENGINE DESIGN THAT ASSURE BETTER PERFORMANCE WITH LOWER OPERATING AND MAINTENANCE COSTS.

RELIABILITY . . . FAST, SURE STARTING COUPLED WITH AN UNFAILING, DEPENDABLE POWER FLOW UNDER ALL LOADS AND AT VARYING SPEEDS, GIVE CHRYSLER ENGINES THE MARK OF A THOROUGHBRED — OUT IN THE FIELD WHERE CLASS TELLS.

CHRYSLER

Hand Hoists Ready In Special Models

Between Pearl Harbor and V-J Day, Beebe Bros., 2724 Sixth Avenue So., Seattle 4, Wash., manufacturer of standard 5-ton hand hoists and Beebe saws with 16 to 26-inch throats, built 24,728 Beebe hoists for various branches of the Government. As soon as its backlog of orders for standard hoists is caught up, this manufacturer plans to have its special models ready for delivery.

These special models are the 5-ton all-steel hand hoist with a 16-inch-wide drum, and also with a 24-inch-wide drum for those jobs requiring additional line for extra length of hauls. The other special is the 15-ton triple-geared unit for very heavy jobs where a lift of 15 tons is required. It is reported that this unit can be blocked up to handle 50, 75, or even 100-ton loads on shorter lifts per hoist. All models are operated by hand.

Complete information on these special Beebe models as well as on the standard 8-inch-drum model may be secured direct from the manufacturer by mentioning this news item.

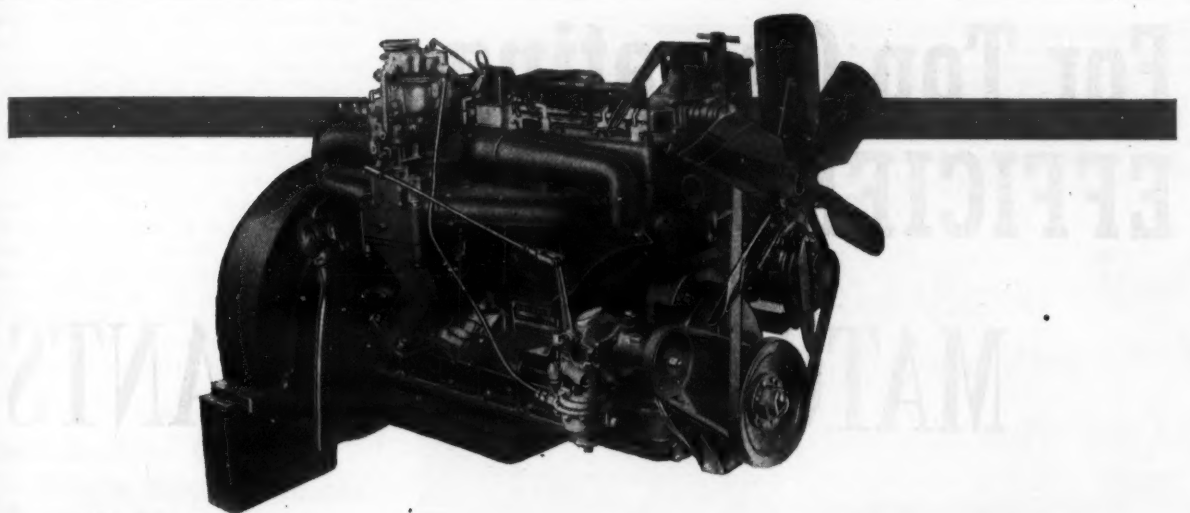
Construction Industry Is Saluted by Reybold

Upon retiring as Chief of Engineers, Lt. Gen. Eugene Reybold addressed a valedictory "To the Corps of Engineers and to Those Who Work With Us" in which he paid a remarkable tribute to the construction industry and the part it played in the war program. After praising the staff of the Corps of Engineers, he said:

"I am equally conscious of America's good fortune in possessing in its construction industry and allied engineering professions a reservoir of workpower uniquely combining the virtues of keenly competitive 'hustle' with high professional standards of honest performance. In a very true sense, the American construction industry and engineering profession took on a blanket contract to perform whatever construction and engineering would be prerequisite to victory. The lives of many of their men were the bond guaranteeing their best performance on that contract. It was a contract of which every man and woman in the industry had a piece. Victory was the last nail in the roof of their completed structure."

Hahn Joins Brown-Bevis

Following his release from duty as a Lieutenant-Commander with the Seabees, Albert P. Hahn has joined the sales staff of the Brown-Bevis Equipment Co., construction-machinery distributor of Los Angeles, Calif. Before the war, Mr. Hahn served with the Edward R. Bacon Co., in Honolulu, San Francisco, and Redding. His duties with the Navy included the command of an Automotive and Construction Equipment Overhaul and Repair Plant in Guam, similar duties at Vernon, Calif., and construction work in Iceland.



Horsepower with a Pedigree

The legend of achievement in the modern world revolves around harnessing horsepower in gasoline engines. It is the force that has lightened man's labors and extended his entire sphere of usefulness and attainment.

Power in industry, on the farm and on the highways is mobile power, "packaged" to meet the needs of all types of equipment dependent on internal combustion engines as a source of energy.

Chrysler Corporation, for a generation, has been producing engines that have, year after year, reflected the scientific research and advanced engineering based on a new conception of dependable horsepower.

Each individual power plant is more than an engine—it is a unit of harnessed horsepower that possesses the fine qualities and character born of superior craftsmanship and tradition.

The hallmark of Chrysler is a pledge that places a new value of known performance traits in the hands of all users of Industrial engines. Here is "Horsepower With A Pedigree".

"OUT IN THE FIELD WHERE CLASS TELLS"

"LISTEN TO THE MUSIC OF ANDRE KOSTELANETZ, THURSDAYS, CBS, 9 P.M. EST."

CHRYSLER INDUSTRIAL ENGINES

Horsepower with a Pedigree

Industrial Engine Division, Chrysler Corp.
12201 East Jefferson, Detroit 14, Michigan

Please send the Chrysler Industrial Catalog.

Name_____

Address_____

City_____ State_____

2

Construction Needs Reconversion Plan

Sells of N. Y. State Dept. of Public Works Suggests Conference to Iron Out Labor, Equipment, and Materials Problems Now Retarding Work

✦ An appeal to contractors to initiate action which will lead to an early and complete reconversion of the construction industry was voiced by Charles H. Sells, Superintendent of the New York State Department of Public Works, at the annual convention of the New York State Chapter of the Associated General Contractors in Buffalo recently.

Defining state policy as militating strenuously against any action which might lead towards either inflation or deflation, Mr. Sells suggested that the state's contractors call a conference with labor leaders and the manufacturers and distributors of materials and equipment in order to iron out the problems which are currently retarding both public and private construction.

Uncertainty Holds Up Bidding

While New York has been more fortunate than many other states in the progress being made on its $840,000,000 five-year construction program, only 40 per cent of the $31,800,000 worth of work offered in the eleven lettings since V-J Day has been successfully bid, Mr. Sells revealed. Commenting on this situation, he stressed the existence of many factors to be considered in the preparation of an estimate, beyond its relationship to the prices for which a contractor will undertake a project.

"I believe nobody will criticize the prevalent policy that public-works construction undertaken by the State shall not compete with the attempts of private industry to re-establish itself and to replenish the depleted larder of civilian goods," the Superintendent said. "It would be a simple matter for the State Department of Public Works continually to increase its estimates until we found some contractor willing to take the work.

"The effect of such a procedure, however, on the economic situation, as affecting most of the people of the state, requires considerable thought. Assuming that the engineers' estimate is constantly revised upwards, inflationary values on construction work would result. While the exigencies of the situation, as far as the State is concerned, might in some measure justify such action, it cannot be forgotten that such an action will have an effect on the prices which private industry might have to pay. I do not believe that the State should lead the way in this inflationary process.

"Our engineers know the intrinsic value of the labor, of the materials, and of the equipment required for operations under normal or reasonable conditions; and they know about how much we can afford to stretch our estimates because of the immediate needs of the situation. We do not know, however, how much safety cushion a contractor might need to put into his bid to insure him against all possible losses which might result from the unsettled conditions presently surrounding the labor, material, and equipment markets. We do not believe that we should provide in our estimates leeway for such cushions to reach inflationary proportions.

"A successful job is one on which harmony, mutual respect, and positive intentions prevail. Such an atmosphere creates a profit for both parties—a satisfactory job well performed for the State and a financial dividend for the contractor. These results are expected."

When extenuating circumstances demand such action, some estimates may

(Concluded on next page)

Construction Needs Reconversion Plan

(*Continued from preceding page*)

be revised, he said, adding, "Today there are conditions beyond the control of the engineer, and of the contractor, which preclude a reasonable interpretation of the conditions under which a project must operate. These unsettled conditions exist in the labor market, as to the stability of wage scales and as to the interpretation and effect of regulations on working conditions.

Equipment and Materials

"Instability exists in material markets. The war took a terrific toll of the natural resources of the country, and insufficient time has elapsed to recreate stockpiles and to reinstate processing procedures. Material manufacturers are loathe, and in some cases unable, to quote dates of delivery, or even prices at dates of delivery.

"Equipment is still a problem. Many of our constructors patriotically surrendered all of their equipment to war agencies. Most of this equipment is completely depreciated. Some of it has not yet returned to its normal use. New equipment has not satisfied the constructor's demands. Many activities are still not completely freed from the effects of the necessary wartime-imposed regulations as to production, prices, and distribution.

"The solution of these problems is our immediate task. Private industry is chafing at the bit with its construction program, awaiting the green light of a stabilized construction field. All of us who are interested in the advancement of a construction program of any character must lend our efforts to a clarification of the problems involved in the labor market, in the manufacture of materials, and in the acquisition of adequate equipment.

Conference Suggested

"Would it not be possible for the contractors, who are so vitally interested, to call a meeting with leaders in labor and with material and equipment manufacturers and distributors?

"At such a conference it might be possible to develop mutual understanding and agreements. I know relationships are getting more and more complicated every day, but the fact remains that the fundamental principles of cooperation are still simple. Why shouldn't a little honest discussion remove the fog and the bugaboos which, when not discussed, often assume such formidable proportions? Both our private and public economy depends on an early solution of these problems.

"We have made our blueprints and we have arranged our finances. The construction industry must be placed in a position where it can safely and intelligently commit itself to long-term contracts with reasonable assurance that it can compute a justifiable bid with a margin of profit and be assured of an opportunity to realize it."

I-H Managerial Changes; Servicemen Returning

New assignments and the return of personnel from military service to managerial posts in its various branches have been announced by the Motor Truck Division of the International Harvester Co., as follows:

C. A. Samuelson, Manager of Minneapolis, has been appointed Manager at St. Louis, succeeding J. W. Blackmore, who has taken over an International Harvester dealership. Mr. Samuelson has been succeeded at Minneapolis by S. A. Hayes, Seattle Manager before the war, and until recently a Lieutenant Colonel in the Signal Corps.

E. N. Black, Sr., Manager of the Cheyenne, Wyo., office, has been assigned to duties at Springfield, Mo. He is succeeded by G. C. Murnan, former Assistant Manager at Portland, Oreg.

Four veterans who served as Assistant Managers at various I-H branches before entering service have been reassigned to other branches. W. G. Schendel, an ex-Lieutenant Colonel, formerly at Pittsburgh, is now at Harrisburg, Pa. W. O. Bolitho, an erstwhile Major, has moved from the Cheyenne office to Billings, Mont. W. C. Habert, who served as an Army Captain, has been shifted from Elmira, N. Y., to West Haven, Conn. Wayne Green, a former Major, transfers his activities from Dallas to New Orleans.

Resuming their old posts are returning veterans G. D. McCarthy and E. E. Krogstad. The latter served in the Navy as a Lieutenant Commander and is Assistant Manager at Tulsa. Mr. McCarthy, a former Lieutenant Colonel, holds a similar post in the Philadelphia office.

New Dozer Booklet

Hydraulic operation of bulldozers is discussed in a new 8-page booklet issued by the Isaacson Iron Works, Seattle, Wash., manufacturer of tractor equipment. Printed in two colors, the illustrated pamphlet discusses all hydraulic dozer features, highlighting the individual advantages of angle and straight-blade models, and the exclusive features of the hydaulic system.

Copies of the booklet may be obtained by addressing the firm at 2917 East Marginal Way, Seattle, Wash.

FREE

THIS HELPFUL BOOK for CONSTRUCTION MAINTENANCE AND REPAIR

ON OIL BURNING

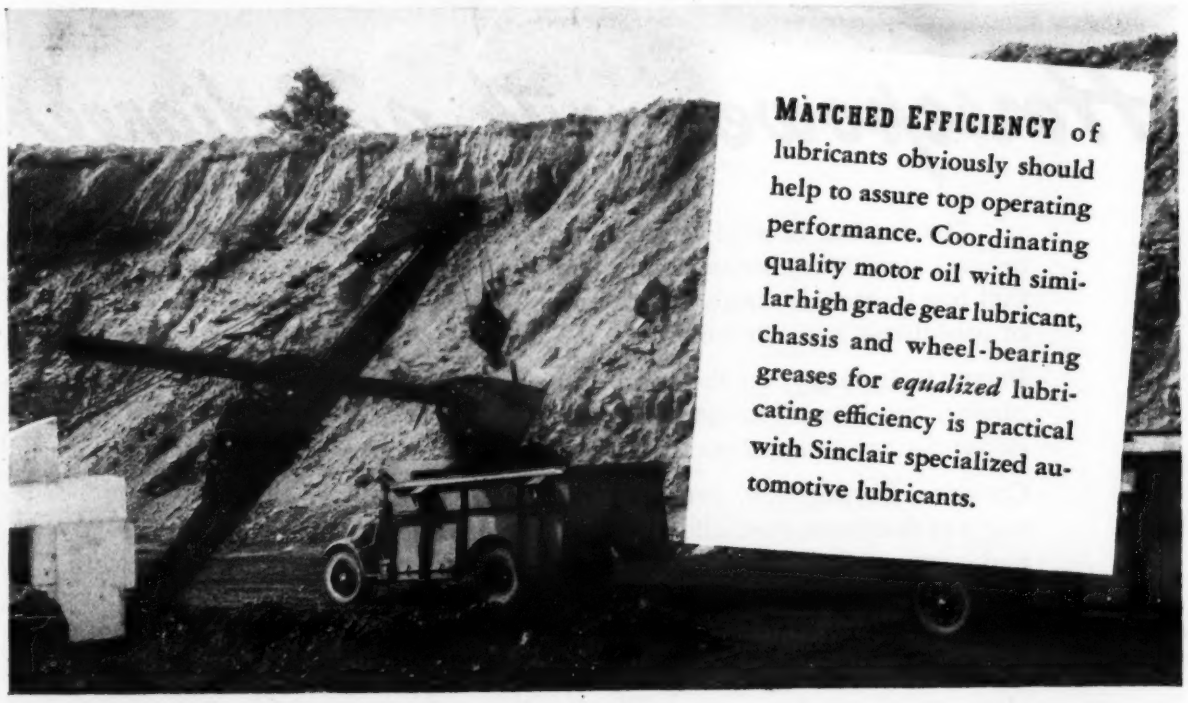
- Tar & Asphalt Kettles
- Bitumen Spray Kettles
- Lead Melting Furnaces
- Compound Melt. Furnaces
- Asphalt Surface Heaters
- Concrete Heaters
- Water Heaters
- Steam Generators
- Salamanders
- Torch Burner Equipments
- Portable Rivet Forges

Every contractor, superintendent and engineer —in road, highway, bridge or building construction or maintenance, can use profitably this catalog on Hauck Heating, Melting and Thawing Equipment to save time, labor and trouble. Write at once.

HAUCK MANUFACTURING CO.
116-126 Tenth St. Brooklyn 15, N.Y.

For Top Operating EFFICIENCY

MATCHED LUBRICANTS



MATCHED EFFICIENCY of lubricants obviously should help to assure top operating performance. Coordinating quality motor oil with similar high grade gear lubricant, chassis and wheel-bearing greases for *equalized* lubricating efficiency is practical with Sinclair specialized automotive lubricants.

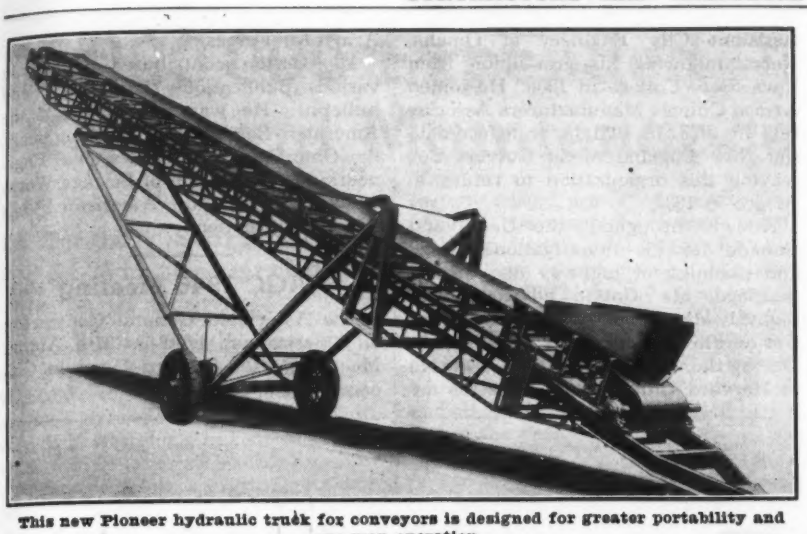
SINCLAIR OPALINE* MOTOR OIL offers positive engine lubrication, free acting rings, resistance to carbon deposit and crankcase accumulations, avoidance of bearing corrosion... OPALINE GEAR LUBRICANT provides extreme pressure lubricating protection to prevent galling and scuffing, resists oxidation under operating temperatures, and is free flowing under Winter conditions... OPALINE CHASSIS LUBRICANT has "staying" properties and built-in extreme pressure characteristics . . . and for wheel bearings SINCOLUBE is designed to meet service temperature and pressure requirements, also keep an adequate lubricating film on balls and rollers, with freedom from leakage to brake linings and hubs.

• • •

Try these matched lubricants for top operating efficiency and economy. *Reg. U. S. Pat. Off.

SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.



This new Pioneer hydraulic truck for conveyors is designed for greater portability and one-man operation.

Conveyor Truck Has Hydraulic Operation

A new cradle truck for portable conveyors, introduced by the Pioneer Engineering Works, features hydraulic operation which permits the unit to be raised or lowered quickly by one man. A simple hydraulic pump, actuated by a lever, gives what is virtually "fingertip" control, the company says. When lowered, the truck is designed to require much less headroom than the old-style mast truck, and enjoys improved portability. The new equipment will eliminate the troubles born of sticking winches, worm gears, cables, and sheaves, Pioneer claims.

Full details on the new cradle may be obtained by writing to the Pioneer Engineering Works, 1515 Central Ave., Minneapolis 13, Minn., and mentioning this item.

Road-Builder Group Elects New Officials

New officers and a Board of Governors were elected at the annual meeting of the Carolina Road Builders' Association, Inc., at Southern Pines, N. C., on December 7 and 8. E. H. Hines, a Greenwood, S. C., contractor, was elected President to succeed Nello L. Teer, Jr., of Durham, N. C. The new Vice President is John W. Thompson of Greensboro, N. C., while Warren J. Mann of Raleigh, N. C., continues in the capacity of Secretary-Treasurer. Charles Ross is general counsel.

The Board of Governors was named as follows: C. P. Ballenger, Jr., Greenville, S. C.; T. R. McMeekin, Cheraw, S. C.; Gregory Poole, Raleigh, N. C.; K. Sloane, Fayetteville, N. C.; Sam Dreyfus, Columbia, S. C.; and Walter Smith, Charlotte, N. C.

At the dinner meeting on the first day of the session, the guest speaker was J. T. Callaway, President, Manufacturers Division of the American Road Builders' Association, and Vice President of the Goodyear Tire & Rubber Co., who chose for his subject "Development of Industrial and Construction Machinery as Influenced by Pneumatic Traction and Flotation".

At the general meeting on the final day, Charles M. Upham, Engineer-Director of the American Road Builders' Association, said that the highway construction program for the nation in 1946 would involve an expenditure of $750,000,000, including all types of traffic arteries from express highways down to farm-to-market roads. Other speakers included Dean John H. Lampe of the North Carolina State College Engineering Department, and Burton F. Miller, Managing Director, Highway Contractors' Division, ARBA. Mr. Miller urged cooperation in the forthcoming highway program and warned that if private industry does not provide jobs Congress will dust off the WPA, give it a new dress, and revive it under another name.

The meeting of the delegates from North and South Carolina went on record as supporting a resolution to cooperate with state highway departments in carrying out a program for grading, draining, and surfacing a large mileage of secondary roads in the Carolinas, and suggested that the item of grading be handled on a lump-sum bid, based on center-line grade without the necessity of cross section and quantities being reduced to yardage units. This short cut was proposed inasmuch as considerable funds are available for carrying out this work, but because of the shortage of experienced personnel in the drafting departments it has been impossible to draw plans with the usual completeness of detail.

The two-day meeting closed with the annual banquet and an address by Congressman Jennings Randolph of West Virginia.

Gibbs Retires

Arthur E. Gibbs, whose development of the first electrolytic cell made possible the manufacture of liquid chlorine, has retired from his post as Advisory Technical Director of the Pennsylvania Salt Mfg. Co., Philadelphia, Pa., to return to his home in England. Joining the firm in 1903, he became the Research Director in 1908 and Manager of Research and Development in 1915.

HOISTS • DERRICKS • WINCHES

A Complete Line of Builders' Derricks and Winches—nationally known for dependable service and long life.

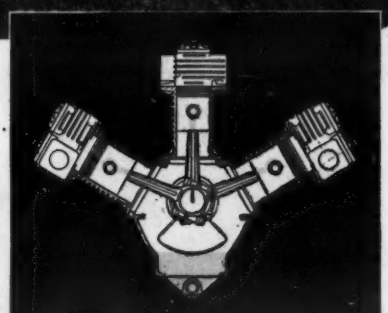
Write for Catalog or send your problems to our Engineering Department

The Sasgen line is handled by leading equipment distributors everywhere.

SASGEN DERRICK COMPANY
3101-27 W. Grand Avenue. Chicago 22, Ill.

AIR PLUS
JAEGER COMPRESSOR
Quiet Please!-Tobacco Asleep
25 Million pounds of finer, lighter, naturally milder
tobacco aging here for Lucky Strike cigarettes

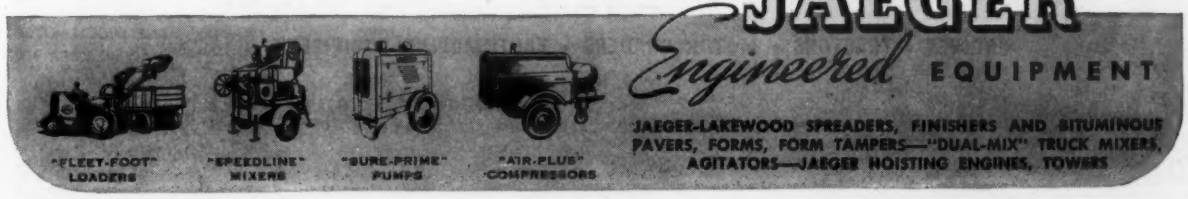
Because they are precision built and balanced, and develop full efficiency at slower piston speed, Jaeger "AIR PLUS" compressors are much quieter and cooler running, deliver more air per pound of fuel with less wear on engine and compressor. Fuel tank is recessed and protected inside the main frame, permitting use of 30% to 50% larger air receivers for less frequent engine acceleration, further fuel economy and cooling of the air . . . These are some of the reasons why compressor users are demanding "AIR PLUS." Ask for complete Catalog JC-5.



Compressor unit is a balanced "W" with interchangeable precision parts, micro-honed cylinders, force feed lubricated thruout.

THE JAEGER MACHINE CO., Columbus 16, Ohio

REGIONAL OFFICES: 8 E. 48th St. NEW YORK 17, N. Y. · 226 N. LaSalle St. CHICAGO 1, ILL. · 235-38 Martin Bldg. BIRMINGHAM 1, ALA.



JAEGER Engineered EQUIPMENT

JAEGER-LAKEWOOD SPREADERS, FINISHERS AND BITUMINOUS PAVERS, FORMS, FORM TAMPERS—"DUAL-MIX" TRUCK MIXERS, AGITATORS—JAEGER HOISTING ENGINES, TOWERS

Highway Research Board To Meet January 25-28

The 25th Annual Meeting of the Highway Research Board of the National Research Council is to be held at Oklahoma City, January 25-28, preceding the meeting of the American Association of State Highway Officials. Sessions will be held at the Skirvin and Skirvin Tower Hotels.

Department and committee meetings will occupy the first day of the conclave, January 25. On Saturday and Sunday, January 26 and 27, sessions of the Board and the departments will be held for the presentation and discussion of papers and reports relating to highway finance, economics, design, materials, construction, maintenance, traffic, and soils investigations. Open sessions for the discussion of needed research programs will be held by the departments on Monday, January 28.

Harry E. Cotton Dies

Harry E. Cotton, Drainage Engineer with Armco Drainage & Metal Products, Inc., died suddenly October 12 at Middletown, Ohio. He was 64.

A native of Iowa, Mr. Cotton became Assistant City Engineer at Omaha, Nebr., following his graduation from Iowa State College in 1906. He joined Armco Culvert Manufacturers Association in 1928. In 1931 he transferred to the New England Metal Culvert Co., leaving this organization to return to Armco in 1936.

Known throughout the U. S. and Canada for his investigational work and planning of highway and airport drainage, Mr. Cotton advised many highway departments and other agencies on drainage for roads and airfields. During the war he lectured on drainage at Harvard University courses for the Army Air Forces.

Mr. Cotton contributed articles to various publications, handbooks, and bulletins. He was a member of the American Society of Civil Engineers, the Ohio Society of Professional Engineers, the Federation of Sewage Works Associations, and the American Public Works Association.

AGC 1946 Meeting

The Associated General Contractors of America will hold its 27th Annual Meeting at the Stevens Hotel in Chicago February 18 to 21.

Zoned Equipment

ZONE 1
"Caterpillar" Diesel track-type Tractors equipped with bull-dozers.

ZONE 2
"Caterpillar" Diesel track-type Tractors for loading and pulling scrapers.

ZONE 3
"Caterpillar" Diesel wheel-type Tractors for high-speed hauls.

DOES THE JOB
better, quicker, cheaper

"Use the right tool for the job" is an old rule—and a sound one—that is followed in every successful factory, shop or craftsmen's trade. It is just as applicable in the great industry of earthmoving. Contractor, customer and community alike benefit when it is put into practice.

Here, for instance, on the Canton-Akron airport project, three contracting concerns got together in setting the job up *right*—with ZONED EQUIPMENT to fit the varying hauls.★ And that's the one "best" way to get top results on *any* large earthmoving operation.

The "Caterpillar" line has been steadily broadened to enable the contractor to "zone" his jobs with equipment obtained completely from *one source*—under the quality-and-performance responsibility of *one manufacturer*—and serviced through *one dealer organization* that is thoroughly equipped, experienced and always within easy reach.

What do *you* need to zone your next jobs for better, quicker, more profitable results? Talk it over with your "Caterpillar" dealer. And also keep in mind that "Caterpillar" *job-engineering* help is available if you want it.

★Illustrations show some of the *zoned equipment* used on this project. It includes 8 "Caterpillar" track-type Tractors operating carry-scrapers on heavy hauls of 1000 feet and under; 3 operating 'dozers on the "push" distances; and 8 "Caterpillar" Diesel wheel-type Tractors operating scrapers on the "speed" hauls of 2000 feet and over.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR DIESEL
REG. U.S. PAT. OFF.
ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT
THE DISCHARGED VETERAN WEARS THIS EMBLEM. REMEMBER HIS SERVICE AND HONOR HIM.

$7,000,000 Expended On Road Maintenance

1945 Program Done Mostly By Contract; Seal Coat and Plant-Mix Resurfacing In Georgia

✦ BY the end of 1945, the State Highway Department of Georgia had spent $7,000,000 in its yearly maintenance program on roads and bridges, the bulk of which was done by contract. The type of work covered by this expenditure included highway resurfacing with bituminous seal coats or plant-mix, placing selected granular material or topsoil on dirt roads, and the repair or reconstruction of wooden bridges.

The $7,000,000 expenditure is a decided increase in maintenance costs over the previous three years, and was caused by heavy wartime travel on the roads in Georgia, a state which had a high proportion of large military training camps with resultant augmented traffic. Travel from the north to adjacent Florida, another state with many Army camps, must also pass through Georgia, thereby increasing the burden on its roads. Because of the equipment and man-power shortage, the State Highway Department, which in years past did most of its maintenance with state forces, had nearly all of this work done by contractors.

Plans for maintenance improvements were worked out last winter, the proposed projects being selected after visual inspection by the Maintenance Engineer, the Paving Engineer, and the Division Engineers. The 159 counties in Georgia are divided into five divisions, each headed by a state division engineer with headquarters in the following cities: No. 1, Gainesville; No. 2, Augusta; No. 3, Macon; No. 4, Tifton; and No. 5, Savannah. The divisions in turn are divided into residencies, each comprising from two to five counties under the supervision of a resident engineer.

The 1945 maintenance work in this largest state in area east of the Mississippi began with the awarding of forty-five contracts on March 21, chiefly for surface treatments in the southern counties. On April 18 forty-one more contracts were let, and by May 4 additional contracts were awarded, bringing the expenditures for contract projects to $3,100,533. Furthermore, over $500,000 of work was done by special state maintenance forces. Additional contracts in the course of the construction season advanced the total cost to around $7,000,000, including the $2,000,000 regularly allotted for routine maintenance. The increase over previous years is indicated in the following table:

Year	Miles of Road Improved	Bridges Repaired	Cost
1943	393	20	$ 897,395
1944	555	22	1,921,661
1945 (to May 9)	675	57	3,100,533

A summary of the 1945 expenditures to May showed the allocation to the various types of maintenance improvements as follows:

Description	Miles	Cost
Topsoil or selected material	130	$ 187,924
Resurfacing (all types)	545	2,684,593
Bridges (repaired or reconstructed)		228,016
Contract expenditures		$3,100,533
Work done by special maintenance state forces on the above items		509,612
Total maintenance expenditures		$3,610,145

Included in this total was approximately $750,000 for widening 18-foot roads to 22 feet. The surfacing contracts varied in length from ½ to 28 miles, and three or four projects close to each other in one area were grouped in one contract. Similar treatment was accorded the bridge contracts, the bulk of which were located in the low southeastern coastal area of the state. One repair contract included fourteen wooden bridges with a total length of a mile. In this way it was possible to utilize local labor to the fullest extent, and to make the most of available timber in the locality, since there was a very critical lumber shortage. The bituminous work was finished by October 15, and all contracts were completed by the end of the year.

Surface Treatment

A typical seal-coat surface-treatment contract was that awarded to Ledbetter-Johnson Co., contractor of Rome, Ga., for 5.3 miles on State Route 16, in Coweta County in the northwest part of the state, beginning at the city line of Newnan and running northwest to Sargent. This company, with one of its crack crews, did 329 miles of this work in 1944, and 332 miles in 1945 or about 70 per cent of all surface-treatment work in the state.

The original road was constructed in 1934 with an 8-inch clay-gravel base 20 feet wide, on top of which was laid a single surface treatment consisting of 0.45 gallon of AC-15 asphalt to the square yard and a cover of slag graded from 1¼-inch down to No. 4 sieve, applied at the rate of 45 pounds to the square yard. Eleven years of use had left the surface rough and broken, patched in many places, and raveled at the edges.

Preliminary preparation of the road, prior to the 1945 work, included trimming the sod and grasses along the edges of the pavement with the blade of a Caterpillar No. 12 power grader. This was followed by a thorough cleaning of the surface by a Grace power broom with blower attachment, pulled by an Allis-Chalmers pneumatic-tired tractor. All cracked areas, holes, or depressions in the road surface were next patched by cutting out the unsatisfactory sections by hand with picks and

(*Continued on next page*)

C. & E. M. Photo

Ledbetter-Johnson Co. used sixteen Ford 1942 trucks with Gibbes spreader boxes to place slag aggregate on a contract for surface treatment on State Route 16 in Georgia.

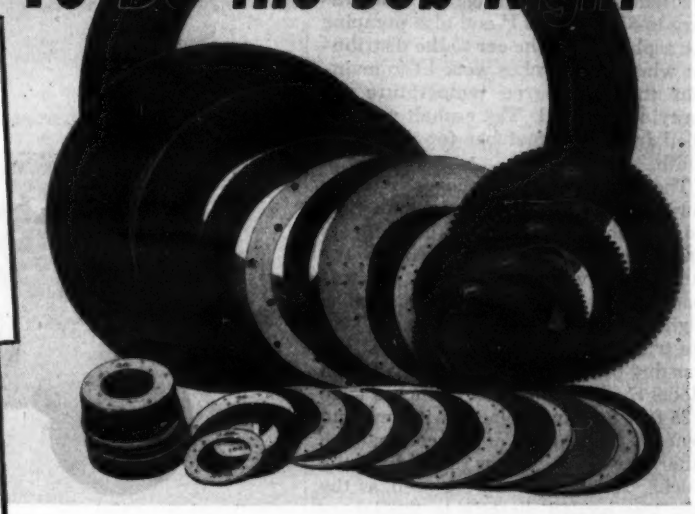
GATKE Brake Lining and Clutch Facings
CUSTOM-BILT To Do the Job Right

GATKE Double Cone Type Moulded Asbestos Swing Friction for a Northwest Shovel. Furnished for all models.

GATKE Moulded Friction of Single Cone Type. GATKE Brake Blocks and Frictions are moulded to machined accuracy in all shapes and sizes.

Heavy Duty Woven Brake Lining. Made in all sizes.

Wire-Back Moulded Brake Lining. Furnished for internal or external brakes.



The *easy handling* dependability, *increased* output and *maintenance economies* afforded by GATKE *CUSTOM-BILT* Brake Lining and Clutch Facings are *profit-building* factors of *incalculable* importance.

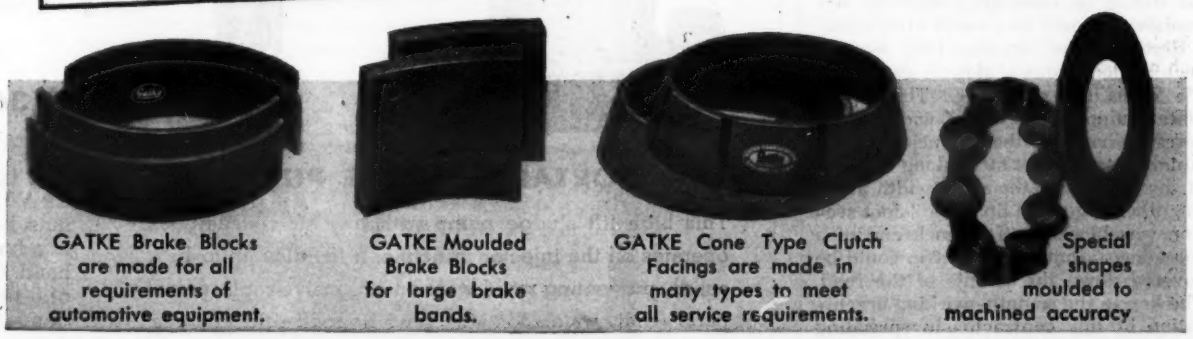
The superior performance results from nearly 30 years specialized effort to meet *tough service requirements* of all kinds.

Day and night, around the globe, GATKE Asbestos Friction Products are *speeding operations and saving maintenance* in Mills and Factories; on Ships, Tanks and Planes; Cranes, Hoists and Winches; Shovels and Draglines; Drilling Rigs and Mining Machines; Earth Movers and Bulldozers.

Comparison is the test. Until you've *used* GATKE Brake Lining and Clutch Facings that are *CUSTOM-BILT for your requirements*, you can't begin to appreciate the marvelous improvements they offer.

Whatever your equipment or service, just send specifications for recommendation. We understand service requirements and we guarantee results.

GATKE CORPORATION
224 N. La Salle St., Chicago 1, Illinois



GATKE Brake Blocks are made for all requirements of automotive equipment.

GATKE Moulded Brake Blocks for large brake bands.

GATKE Cone Type Clutch Facings are made in many types to meet all service requirements.

Special shapes moulded to machined accuracy

$7,000,000 Expended On Road Maintenance

(*Continued from preceding page*)

shovels, filling these areas with the same slag used in the cover coat by shoveling the material from a dump truck, and then giving the slag a penetration treatment of AC-15 asphalt. The asphalt was applied by an Etnyre 1,285-gallon pressure distributor mounted on a Mack truck, using a hand hose with a single nozzle attached to the rear of the tank. More slag was then shoveled on top of the patch as a choke course, and given a rolling by a Buffalo-Springfield 5-ton tandem roller.

Seal-Coat Materials

The AC-15 asphalt, of 150 to 200 penetration, used in this surfacing operation was purchased from the Standard Oil Co. of Louisiana and shipped in tank cars from its refinery at Baton Rouge 500 miles by rail to a siding of the Central of Georgia Railway at about the middle of the project. Here the asphalt was heated to 180 degrees F in the tank car by a Cleaver-Brooks tank-car heater mounted on a Ford 1½-ton truck. A Grace booster, on a Chevrolet truck, was then put on the tank car, increasing the temperature to 350 degrees F and also pumping the asphalt from the car to the distributor where the torches were lit to maintain the 350-degree temperature for spraying the road. The asphalt was applied from a 20-foot bar for the entire width.

The slag used for the cover coat was purchased from the Birmingham Slag Co. and shipped in hopper-bottom cars 300 miles from Birmingham, Ala., to the same siding where the asphalt was unloaded. The siding track was on a slight embankment, and in order to load the trucks directly from the cars a hole was dug beneath a few ties and a Burch Model SU belt conveyor, 30 inches wide x 25 feet long, was placed with one end beneath the hopper of the car and the other end elevated over the body of the trucks. No stockpiles were used, as the slag was hauled directly to the job as soon as a truck was loaded. Enough railroad cars of material were always on hand to assure an adequate supply, and these were switched about above the conveyor belt by a Caterpillar Fifty tractor which easily pulled the cars along the track with a long cable.

The gradation of the cover slag was as follows:

Sieve Size	Per Cent Passing
¾-inch	100
½-inch	95-100
⅜-inch	25-75
No. 4	0-8
No. 8	0-3

Efficient Crew

The distributor unloaded its 1,285 gallons of asphalt in 1,765 feet of 20-foot pavement, at the rate of 0.3 gallon to the square yard. Traffic was held at each end by flagmen until the bituminous material was covered by the slag. This distance was covered with the slag aggregate in from 20 to 25 minutes by a picked crew, most of whom have worked together from 10 to 15 years. During that time each man has learned his duties so thoroughly that the organization works like a well oiled clock.

Sixteen Ford trucks, 1942 models, each hauled 5 tons of slag an average of 2½ miles for spreading. The trucks were equipped with 8-foot-wide Gibbes spreader boxes so that a truck was first run down an 8-foot strip along one side of the road, then the same width along the other edge, and finally a 2-foot section was blocked off at each end of a spreader so that a 4-foot strip could be covered down the middle of the road. The key to the smooth-working organization of this contractor in spreading the aggregate was the use of one man to back all the trucks and another man to do all the spreading. As the trucks jockeyed into position for backing up, the regular driver dismounted and the special "back-up" driver took over the wheel, while a tall, rangy negro jumped to the rear of each truck to be unloaded and operated the spreader-box release. In this way the 22 to 24 pounds of slag to the square yard was always spread uniformly over the asphalt. When the truck was unloaded, the driver sped back to the other trucks and took over a fresh load.

At each point where the distributor began spraying, a 4-foot strip of paper was stretched across the road over the end of the previous application to catch the surplus from the spray bar and not have an excess of asphalt at the joints, which would result in bleeding later on.

Quantities and Personnel

With a crew of 35 men, Ledbetter-Johnson Co. averaged 5 miles of 20-foot-width surface treatment in a 10-hour day. This working force was used in the following capacities:

Superintendent
Grader operator
Tractor operator
Distributor operator and driver—2
Tank-car heater and booster operators—3
Conveyor operator and helpers for unloading slag—3
Power-broom operator
Flagmen—2
Paymaster
Mechanic
Special "back-up" truck driver
Special spreader man
Roller operator
Truck drivers—16

A total of 15,000 gallons of asphalt and 900 tons of slag were used on this project, the contract price of which was $6,631.50. R. Abie was Resident Engineer for the Georgia State Highway Department and E. W. Haskin, who has been engaged in bituminous surface treatments for the past 18 years, was Superintendent for the contractor. This project was completed in the early part of May.

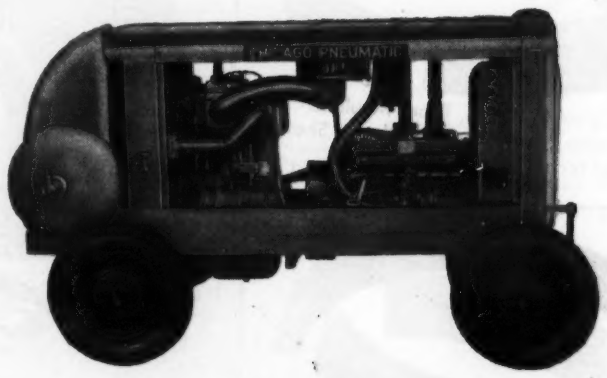
Plant-Mix Job

Another project, typical of the plant-mix type of surface, was awarded to MacDougald-Warren, Inc., Atlanta contractor, for laying 5 miles of plant-mix on Memorial Drive, State Route 41, partly in the city of Atlanta and partly in DeKalb County. This road varies in width from 32 to 40 feet between curbs, and connects with U. S. 78 on the road to Stone Mountain east of Atlanta. The section improved was between Moreland Avenue and Candler Road, and consisted of some bituminous and some concrete pavement built about 20 years ago by DeKalb County. The new surface covers a rough and cracked pavement.

MacDougald-Warren operates a commercial bituminous hot-mix plant in Atlanta, and to transport the modified Topeka mix to the job site fourteen trucks were hired from A. G. Wimpy, hauling contractor of Dahlonega, Ga. The trucks, which were hired on the basis of tonnage hauled, consisted of Fords, Chevrolets, and Internationals holding between 5 and 7 tons. The average haul from Atlanta was 15 miles.

(*Concluded on next page, Col. 4*)

Use CP Equipment

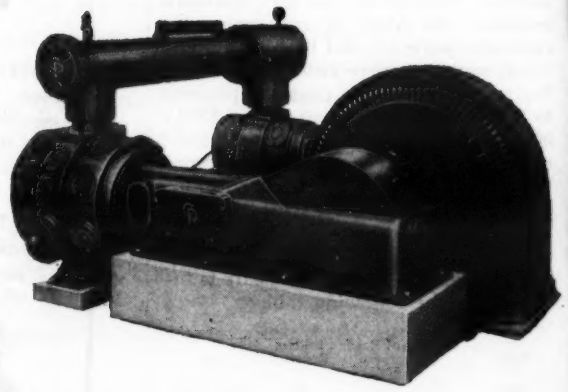


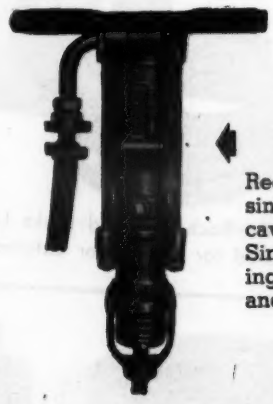
CP PORTABLE COMPRESSORS

You get 15% to 35% more air per gallon of fuel with CP Portable Compressors. Design refinements include: gradual speed regulation, Simplate Valves, pressure lubrication and self-adjusting clutch. Sturdy, economical CP Portable Air Compressors are available in gasoline-powered models of 60, 105, 160, 210 and 315 c.f.m.; and in Diesel-powered sizes of 105, 160, 210, 315 and 500 c.f.m.

CP STATIONARY COMPRESSORS

Designed to fulfill every requirement for heavy-duty, continuous service, the Chicago Pneumatic O-CE Motor-Driven Compressor, here illustrated, is sturdily built and conservatively rated. It is furnished in capacities up to 10,000 c.f.m. Other CP Stationary Compressors are supplied in vertical and horizontal designs for steam, belt and electric motor drive, in a wide variety of capacities and pressures.





CP-32 SINKER DRILL

Recommended for all types of shaft sinking, quarry drilling, general excavation and road work, the CP-32 Sinker Drill is noted for its fast drilling, its high speed, strong rotation and good hole cleaning qualities.

CP-7 PORTABLE SLUDGE PUMP

This high lift sludge pump with low air consumption operates on the injector principle. It handles up to 15% solids, preventing rapid wear on expensive replacement parts when water contains sand or rock drill cuttings.

CP 365-RP PNEUMATIC WRENCH

This fast powerful Impact Type CP Wrench applies or removes nuts, bolts, lag screws and studs in a fraction of the time it takes to do the job by hand. Capacity: 1¼" bolt size. CP 365-RP is one of 6 time-saving CP Pneumatic Wrenches, handling bolts, nuts, etc. from ⅜" to 1¾" bolt size.

Ohio Safety Campaign For Winter Driving

A call to all drivers in the state to exercise greater care against accidents than ever was sent out recently by Perry T. Ford, Director of the Ohio Department of Highways. This winter has been predicted to be the "worst auto-accident winter in history", he pointed out, reviewing the increase in traffic with the war's end, the decrepit condition of most automobiles, the inevitable hazards of snow and ice, and more hours of darkness in winter.

The answer to the winter safety problem, the Director said, lies in the best possible road maintenance, in the education of motorists to take practical precautions, and in proper car upkeep. Urging local highway departments to be ready for winter road maintenance, he promised them the cooperation of the State. "A motorist whose car is in shape has the safety battle half won", he concluded.

Now that good paint is again available, the Ohio Department has contracted for 2,000 gallons of yellow paint, and 12,000 gallons of white, for striping and re-striping the state's highways. The job will continue all winter, whenever weather permits. One-third of the state's painted pavement mileage is done in yellow to denote no-passing zones, horizontal and vertical curves, intersection and railroad crossings, and visibility less than 600 feet.

Hoping to cut winter hazards to a minimum, the first striping operations were restricted to fog areas which are prevalent throughout the state.

Alloy Castings Make Generators Portable

Designed as portable power sources for electric tools, floodlights, etc., two new gasoline-engine-driven generators have been announced by the Homelite Corp., 71 Riverdale Ave., Port Chester, N. Y. These generators are made with all large castings of aluminum alloys to permit increased output while retaining portability. Model 21-D is a 2,000-watt 120-volt dc generator, weighing 105 pounds. Model 21-A, weighing 115 pounds, generates 1,800 watts, 115-volt, 60-cycle, ac. Each unit measures 22⅜ x 17⅛ x 21⅛ inches. New design features, developed for the Army and Navy and tested under combat conditions, are incorporated in these new models.

Each generator is powered by a single-cylinder air-cooled two-cycle engine having only one rotary-disk-type valve which is self-seating and requires no adjustment. A strong spark for easy starting is provided by a high-tension Wico magneto. Engine speed is controlled by an automatic built-in mechanical governor. A pressure-vapor oil system provides overall lubrication. The generator is connected directly with the engine, the armature being mounted on the crankshaft.

Bulletin L-404 which describes these two generators may be secured by writing to the manufacturer.

$7,000,000 Expended On Road Maintenance

(*Continued from preceding page*)

The surface of the road was first primed with an application of 0.12 gallon of RT-3 tar to the square yard, sprayed from a 20-foot bar on an Etnyre 1,200-gallon distributor at a temperature of 125 to 150 degrees F. The tar also came from the commercial plant in Atlanta. The tar prime was immediately covered with the plant-mix laid 100 pounds to the square yard by a Barber-Greene finisher in a single course which compacted to 1 inch under rolling by two Galion 10-ton tandem rollers. Where the pavement was 32 feet wide, two 11-foot and one 10-foot lane were paved in order across the road, while the 40-foot width consisted of four 10-foot lanes. While one lane was being paved, the others were open to traffic.

The Mix

At the plant 1-ton batches were mixed according to the State Highway Department of Georgia specifications for Modified Topeka Pavement, Type 1. This consisted of the following parts by weight:

Material	Per Cent
Crushed-granite stone, No. 7	47
Granite-stone screenings	43½
Mineral filler, limestone dust	2
AC-6 asphalt, 120-penetration	7½
	100

The gradation of the No. 7 stone and the screenings follow:

Sieve Size	Per Cent Passing No. 7 Stone	Screenings
½-inch	98-100	100
⅜-inch	30-70	95-100
No. 4	0-15	60-85
No. 10	0-13	30-50
No. 16	.....	.....
No. 40	.....	15-40
No. 80	.....	10-20
No. 200	.....	5-10

A 10-man crew with the bituminous finisher averaged between 400 and 500 tons in a 10-hour day. The crew consisted of a foreman, a finisher operator, 2 roller operators, 3 rakers, and 4 shovelers; the rakers also worked the lutes in the final straight-edging. When two lanes were completed, the remainder of the road was primed with tar and then covered with the plant-mix. The road was worked in ½-mile sections, the full width being completed before advancing to the next section.

Quantities and Personnel

A total of 6,450 tons of plant-mix was required for this 5-mile paving job which cost $45,795 and was completed during the first three weeks of May. N. R. Nash was Inspector for the Georgia State Highway Department, while for MacDougald-Warren H. M. Makenson was Superintendent and G. B. Pope was Foreman.

G. T. McDonald is State Highway Engineer of Georgia, while C. F. Bond is Maintenance Engineer and J. F. Mathews is Paving Engineer. R. L. Sutton is Assistant Maintenance Engineer.

Commission Studies Tolls For Financing N.Y. Route

The possibility of making the projected New York State Thruway System, work on which is to get under way this spring, a toll facility is being studied at present by a special Commission comprising Henry T. Brinckerhoff of Parsons, Brinckerhoff, Hogan & Macdonald, and M. J. Madigan of Madigan-Hyland, with Hal G. Sours, consulting highway engineer, as Chairman. Available data and additional information obtained in the field are being used to determine whether or not the project would support tolls in sufficient amount to justify the State's financing the work through that source of revenue.

to . . .

SPEED WORK
SAVE TIME
CUT COSTS

For almost 50 years, efficient CP Air Compressors, Rock Drills, Backfill Tampers, Wagon Drills and Pneumatic Tools have set the pace in day-after-day dependable performance — and are equally noted for their low maintenance cost. In the extensive CP line, you will find time-saving equipment for every purpose — in sizes and capacities for all contracting needs. Write today for your copy of Catalog No. 600.

CP CLAY DIGGERS

For general digging in soft to medium hard clay, the lightweight CP-3 Clay Digger is unequalled in speed and ease of handling. For digging in hard clay, shale, etc., the CP-5 is recommended.

CP NO. 5 DIAMOND DRILL

Weighing only 160 pounds without puller, this one-man diamond drill combines drilling speeds, ease of handling with mum core recovery and low cost per foot d. Working in any standard saddle, in any ion from a column, arm or crossbar, the CP Diamond Drill, with EX fittings, has 500-ft. city. Also widely used for blasthole drilling.

CP-60N MOTORdrifter

To do a fast, low cost drilling job in hard, seamy or ravelly formations, or tunneling from Jumbo drill carriages, no drifter is better than the 3½" CP-60N MOTORdrifter. It materially speeds drilling cycle, lessens operator fatigue, reduces overall time and expense, and avoids accident risk.

EUMATIC TOOLS
ECTRIC TOOLS
DRAULIC TOOLS
ROCK DRILLS

CHICAGO PNEUMATIC TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

The new Bucyrus-Erie 38-B is a 1½-yard fully convertible excavator.

Speedy New Shovel Fully Convertible

Modern materials, selective hardening, and scientific weight distribution have been incorporated in the design of the new Bucyrus-Erie 38-B shovel. The unit, a 1½-yard fully convertible excavator, has shown a remarkably fast operating cycle resulting in a continuous high output over a period of field testing, the manufacturer says.

Ample capacity, easy control of clutches, drum capacities and dimensions, balance of speed and power, accessibility of machinery, and easily mounted and demounted front ends are features of the new 38-B. The machine is able to match the speed of a smaller shovel through synchronization of speed and power and distribution of weight, it is stated. Highly responsive clutches and brakes with direct control give the operator the accurate "feel" so desirable for large steady output.

Equally effective as a shovel, dragline, crane, or clamshell, the new 38-B has a number of operating refinements. As a dragline, it has big working ranges, with a new mast-type suspension available for long booms. Full rotating fairlead and a selection of wide, long, and tapered-end crawler mountings for ample bearing area in soft going are other features. A strong light boom, with large-diameter point sheaves, independent positive twin-rope crowd, and high-lip all-welded dipper, feature the 38-B as a shovel. When used as a crane, the unit has long booms, 2-clutch independent boom hoist, optional jib extensions, and optional independent 2-speed propel.

Full details may be secured on mention of this description when writing Bucyrus-Erie Co. at South Milwaukee, Wis.

Caterpillar Assignments

The appointment of Carl F. Schober and Kenneth F. Ames to the Central Sales Division has been announced by the Caterpillar Tractor Co., Peoria, Ill. Mr. Schober, who joined the firm in 1941 in the treasury department, has been serving in the Washington office in various wartime activities. In his new post he will be District Representative in Texas and New Mexico.

Mr. Ames was Agricultural Representative for the firm in Minnesota and North Dakota from 1936 until entering the Army four years ago. Discharged as a Captain, he returns to the division to become District Representative in Montana, North Dakota, Saskatchewan, and Alberta.

Catalog-Manual on New Single-Acting Pile Hammer

For driving into such dense substances as stiff blue clay, heavy gumbo, incipient shale, hardpan, compacted gravel, etc., as well as for driving heavy mass piles, where the high frequency blows of a double-acting pile hammer are not particularly advantageous, the McKiernan-Terry Corp. has added a line of single-acting pile hammers.

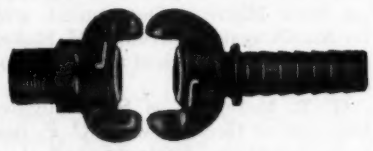
These new pile hammers are described in an illustrated 16-page booklet now available from the firm. The special purposes for which the hammer is designed, including underwater operation, are outlined. Diagrams illustrate the entire mechanism, showing the component parts. Specifications, bearing-power formulas, and five pages of operating notes complete the booklet.

Readers of this magazine may procure copies by writing to the McKiernan-Terry Corp., 19 Park Row, New York 7, N. Y. Mention this report and ask for Bulletin 57.

KELLY HOSE COUPLINGS

TROJON AIR HOSE COUPLINGS

MALLEABLE IRON—RUST PROOFED



UNIVERAL TYPE—Locking heads of all styles and sizes interchangeable from ¼" to 1".

QUICK-ACTION—Instantly connected or disconnected with one quarter turn.

TIME TESTED — DEPENDABLE. Manufacturer of these couplings since 1921.

Write for Catalogue No. 110

Distributors in most principal cities

KELLY CHICAGO MACHINERY COMPANY

HOSE COUPLING DIVISION

2524 W. MADISON ST. CHICAGO 12

Anthony HAS IT...

CONSTRUCTION EQUIPMENT THAT KEEPS TRUCKS ON THE MOVE

- ***Anthony "Super" Hydraulic Hoists and Bodies,*** up to 30 ton capacity—with "power speed lift" and "rubber restraining blocks", two of many features that explain the evident preference for Anthony equipment on the job.
- ***Anthony Hydraulic Lift Gate*** . . . one of the remarkable new war-developed pieces of equipment for loading and unloading. Raises and lowers loads from ground to truck level.
- ***Anthony Material Spreader,*** rugged, all steel; for road building, maintenance and ice control.
- ***Anthony Hydraulic Platform "Booster" Hoists,*** especially designed to make dump bodies out of flat bed trucks.

Write for complete details on any Anthony product. Available through all truck dealers and Anthony distributors.

ANTHONY HYDRAULIC

Manufactured by ANTHONY CO. Streator, Illinois

Grading Problems

(*Continued from page 1*)

ard & Slate, and extended from Woodland to Martins Bluff, a distance of 12,544.5 feet. It consisted primarily of widening the existing highway on the east side and included side-hill cuts as much as 230 feet in depth. Presence of the Northern Pacific Railway on the west prohibited any shifting of alignment on that side, so that making the high cuts on the east was the only way in which the width required for the new four-lane design could be secured. A peculiar condition existed, in that the bottom portions of most of the cuts, at the approximate grade of the existing road, were in sand varying in depth from 25 to 50 feet, while above the sand solid rock extended to the top of the cuts. The upper portion of the rock was somewhat softer than that just above the sand and could, in most cases, be broken up by tractor-drawn rippers and moved by scrapers. The hardness increased, however, as the distance below the top became greater, and in many of the cuts it was necessary to resort to blasting on approximately 20 feet of the total depth.

The less dense top material was loosened by three LeTourneau Rooters and moved by four dozer units, two Caterpillar D7's with LeTourneau blades and two D8's with a Caterpillar and an Isaacson blade, two 15-cubic-yard and two 20-cubic-yard LeTourneau scrapers pulled by Caterpillar D8 tractors, and five 12-cubic-yard Super C Tournapulls. The bulldozers first opened a notch at the top until the width was sufficient for the use of the hauling units, and then assisted them in loading, both by pushing and concentrating the material for quick loading. After the units had moved down from the high elevation of the upper cuts, the hauling was along the old road for an average distance of 2,500 feet. Return was also along the old road to a point beyond the cut where loading was started. The hauling units made the climb empty and loaded downhill in the direction of the embankment to which they were hauling.

When the rock became too hard for continued economical rooting, a 315-cfm Ingersoll-Rand compressor was moved in to furnish air for two No. 55 Gardner-Denver drills. Starting with 2¼-inch-diameter Timken detachable bits, the contractor drilled vertical holes, spaced about 6 feet apart. The size of the hole was reduced by ⅛ inch for each 3 feet of depth, to 1½ inches on the 20-foot maximum-depth holes drilled. Because of the proximity of the traveled highway and the railroad, it was necessary to load and shoot very lightly so ½ pound or less of dynamite was used per cubic yard of rock, which was shot out to the free face. All shots were fired by electric exploders.

The rock from the lower portions of most of the cuts was loaded by a Lorain 1½-cubic-yard shovel into three 12-cubic-yard Super C Tournapulls, fitted with sideboards to haul 15 cubic yards, and a Koehring 5-cubic-yard Dumptor. All grading was carried on for two 9-hour shifts daily.

At the embankment two Caterpillar motor graders and a D7 with bulldozer spread the dirt in 8-inch loose layers for the full width of the fill, blading it constantly, while the heavy hauling was carefully distributed to secure maximum compaction of the embankment. To aid in this compaction, as well as to reduce the serious dust menace, sprinkling was continuous during working hours. The water for this was taken from a creek nearby by three centrifugal pumps which were advantageously spaced along its bank, delivering to a truck-mounted 1,200-gallon tank which discharged on the fill by gravity through a sprinkling bar.

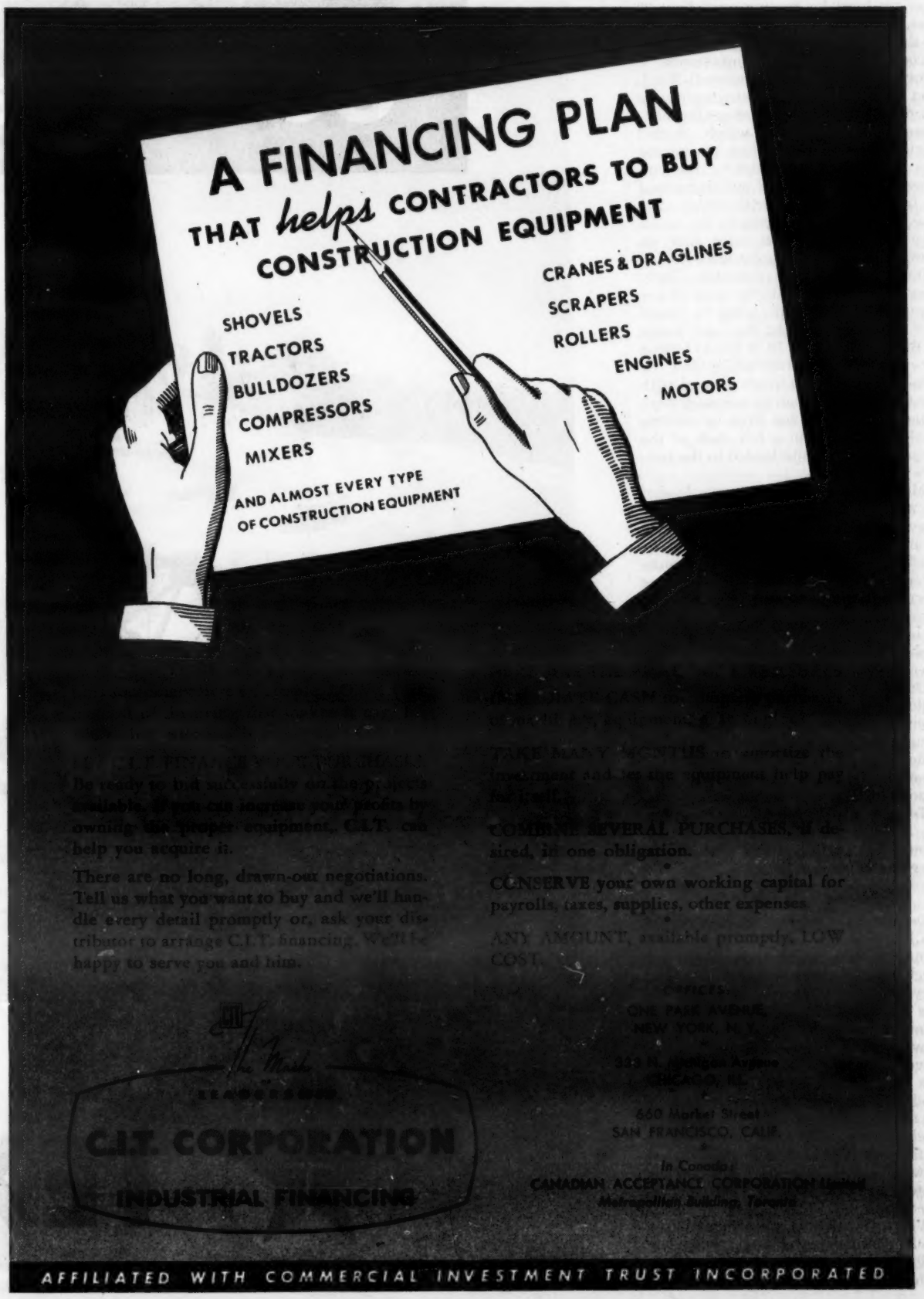
Erickson Paving Co. Job

The second section of this work ran from Martins Bluff to Chicken Coop Inn, a distance of 18,190.8 feet, and was performed by the Erickson Paving Co., Seattle, Wash. In this section the alignment diverges somewhat from the old road, except in the first mile, so that traffic was a less serious delaying factor than on the section to the south. At points where the present highway crosses the work, traffic was controlled by red-coated and helmeted flagmen furnished by the contractor.

The general type of work varied considerably from that in the Leonard & Slate contract, consisting primarily of rather heavy cuts through the ridges of the rolling topography, with moderately heavy fills between the cuts. Although the Superintendent found it a difficult job to organize successfully, good progress was made. In addition to the acute shortage of labor, and the unwillingness of labor to work every day, the job was complicated by the construction of culverts under most of the fills, and the presence of rock in the

(*Continued on next page*)

A Caterpillar D8 with Isaacson bulldozer starts a cut on a hillside on the Leonard & Slate section of the relocation of Highway 99 in Washington.



Grading Problems

(*Continued from preceding page*)

bottom of many cuts.

In most cases the cuts were opened by an outfit consisting of eight Caterpillar D8 tractors which pulled one 18-cubic-yard and four 24-cubic-yard LeTourneau scrapers and handled the two LeTourneau and one Isaacson bulldozer used in spreading the fills, pushing the scrapers during loading, and pulling a LeTourneau Rooter in the upper and softer layers of rock in the cuts. Working a single 9-hour shift, this outfit averaged about 1,000 cubic yards per day on a 1,000-foot haul, according to the Superintendent, but its progress was hindered by the necessity for frequent shifts due to rock. In some cases it was considered advantageous to work the tractor and ripper for two full shifts in the softer rock to provide enough material for the 9-hour shift of scraper operation.

The average depth of the rock which was too hard for rooting was about 20 feet, usually extending the entire width of the cut. When this rock was encountered, two 315-cfm compressors, a Worthington and an Ingersoll-Rand, and two 210-cfm Worthingtons were used to furnish air for eleven Gardner-Denver jackhammers which drilled vertical holes at 6 to 8-foot spacing for the full depth and width of the cut. Wagon drills were tried but abandoned in favor of the hand drills which gave less trouble from sticking in the holes. The rock was exceptionally easy on bits and 8 to 10-foot holes were drilled without reducing the diameter. Early blasting was done entirely with 40 per cent gelatin dynamite, using ¾ pound per cubic yard, but in the later stages of the work du Pont RCB No. 4 blasting powder was used successfully and the Superintendent was much pleased with the fast loading which its use made possible. The charge was fired by electric exploders placed in a full stick of the 40 per cent dynamite loaded in the bottom of the holes.

Most of the broken rock was loaded by a Northwest 1¾-cubic-yard power shovel into six Fageol trucks, three of 5-cubic-yard and three of 10-cubic-yard capacity. When available, some hired trucks of various sizes and makes were used on the longer hauls. The shovel was operated through two 9-hour shifts and its average production was 1,000 cubic yards per shift with an average ½-mile haul for the truck fleet.

On the longer hauls, the number of which was increased due to the frequent moves and changes caused by the occurrence of rock, the movement of material, both the top dirt and in some cases the blasted or rooted rock, was handled by four 18-cubic-yard Super C Tournapulls. This organization, working for a single 10-hour shift, moved about 2,500 yards per day with a haul approximating ¾ mile.

Bleeding a Muck Pocket

One of the interesting features of the Erickson contract was the experimental dewatering method used on a muck pocket about 600 feet long and varying in depth from 9 to 18 feet. It was decided during the preliminary planning not to excavate it but to treat it with vertical sand bleeders to remove the water. The first operation was to place a 2-foot-thick blanket of sandy gravel over the entire area of the muck pocket, end-dumped progressively across it, to provide a working surface for the equipment used later, as well as an outlet for the water expected to rise through the vertical bleeders.

When the blanket was completed, a truck-mounted power auger moved in and drilled holes at 12-foot intervals in both directions through the blanket and as far into the top of the peat muck as it was possible to keep the holes open, usually not over 12 to 18 inches. Immediately behind the auger a wooden-skid rig with 24-foot leads and an 1,800-pound drop hammer powered by a gasoline engine was used to drive 24-inch-diameter metal shells in these holes. The muck inside the casing was then removed, first by the use of a railroad rail 8 feet long equipped with expanding wings which gave it a 10-inch diameter when it was withdrawn after being driven into the muck. The sticky muck was cleaned out of the wings by hand shovels and the process repeated. Farther down, when the muck became fluid, this tool was replaced by a bottom-opening bailing bucket which completed the removal of the muck from inside the casing. When the excavation had been completed, the metal shells were filled with a pit-run sand, and then withdrawn by the hoist on the pile driver.

In order to observe the effectiveness of the sand drains while placing the embankment, two 4-inch-diameter holes were excavated to the approximate center of the muck pocket and a 1½-inch-diameter wellpoint set in them, surrounded by sand. Above the wellpoint and around the pipe leading up from it, impervious material was tightly packed and the pipe was extended upwards in short sections during the placing of the fill. At the top of it, a nipple was provided for the connection of an air bleeder and a water-pressure gage. By means of this device the effectiveness of the vertical drains could be checked continuously. They proved to be satisfactory and no water pressure developed.

As a means of checking the settlement of the muck as the load applied in placing the 35 to 40-foot fill squeezed the water out through the vertical drains, a 14-inch square plate was set on top of the blanket of selected material between the muck and the fill with a ¾-inch pipe welded to it and extended vertically as the height of the fill increased. The elevation of the top of the pipe, and consequently of the square plate welded to its lower end, was checked after each 5-foot increment of embankment had been completed to learn the rate and total amount of settlement, which is expected to approximate 2 feet.

The Strong & Macdonald Job

The third section of this work, extending from Chicken Coop Inn to Kalama, a distance of 10,988.9 feet, was about 95 per cent solid rock, which permitted working throughout the winter with little delay due to inclement weather. Although it was on a new location and well away from the old road, it was close to the main line of the railroad. Preliminary work included the removal of muck pockets at the site of some of the embankment, and a Northwest dragline with a 1¼-cubic-yard bucket was used for this work. Such stripping as was done before the rock cuts were drilled consisted of merely bulldozing the material into

(*Continued on next page, Col. 4*)

Get more power f

U. S. Army Air Forces Photo

TEXACO

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON SUNDAY NIGHT ME

Copyright, Esquire, Inc. 1945

Road Block—Model 1907

The hazards of competition in the Glidden Tour, one of the early reliability runs for the horseless carriage, was the subject of a painting by Peter Helck in the November issue of *Esquire*. Artist Helck humorously portrays a large 1907-vintage Buffalo-Springfield roller blocking a single-lane road, to the dismay of the Glidden contestants. Data for the full-color gatefold-size reproduction was gathered by the artist from Buffalo-Springfield Roller Co. files.

An accompanying article, "Petroleum Parade, 1907", recalls the many mishaps that made early motoring a real adventure.

Ransome Staff Changes

Appointments in the engineering department of the Ransome Machinery Co., Dunellen, N. J., have been announced as follows: John P. Faver, Assistant to the General Manager and Consulting Engineer; J. E. Bushnell, Chief Engineer; and George W. Cronk, Chief Draftsman. A subsidiary of the Worthington Pump & Machinery Corp., Ransome manufactures concrete pavers and mixers, which are available through the Worthington Construction Equipment Division.

Grading Problems

(Continued from preceding page)

piles to be loaded later by the shovels which followed the blasting, or loading by the smaller shovel available on the job, and hauling to the embankments.

Eight 55-pound Ingersoll-Rand Jackhamers were used for the drilling, with air furnished by one 260-cfm and two 315-cfm I-R compressors. Since the cuts were too deep to be drilled in one lift, they were taken out in lifts of approximately 20 feet and in two or more sections 36 feet wide so that the movement of rock by blasting was largely lateral into a previously freed space after the initial cut had been made. Timken detachable bits were used in diameters from 2½ to 1⅜ inches, the reductions being made by ⅛-inch increments with the change in drill steel at either 2 or 4-foot intervals. Because the hardness of the rock varied considerably and the immediate proximity of the main-line railroad prevented heavy shooting, there was some variation in the loadings, but 10-foot spacing of holes which ranged in depth up to 24 feet, with 20 feet as the average, was the customary practice, with ¾ to 1 pound of 40 per cent dynamite per cubic yard of rock as the usual load.

Three Northwest shovels, a 1½-cubic-yard Model 6 and two 2½-cubic-yard Model 80's, loaded to nine 6-cubic-yard Koehring Dumptors and six 12-cubic-yard Euclids. The hauling units were varied in number and kind under the three shovels in accordance with the loading conditions and the length of haul, which averaged less than 20 stations. Four Caterpillar D8 tractors with LeTourneau bulldozers spread the rock in the embankments.

The Parker Schram Job

The fourth section, from Kalama to the Kalama River, a distance of 8,429.8 feet, was a vastly different type of grading. Lying principally across the river bottom, it consisted entirely of embankment, and the original plans of the Highway Department were to construct a hydraulic fill on this section. Contractors were unwilling to bid the job in this manner, however, so it was readvertised with an alternate providing for obtaining the material for the embankment wherever the bidder might choose and transporting it by methods of his selection. Under this alternate, the job was awarded to the Parker Schram Co. of Portland, Oreg., which acquired a borrow pit nearby.

This pit was located on a side hill 2,000 feet away from the line of the embankment, and the haul road from the pit intersected the project 24 stations from one end and 60 stations from the other. By the end of the job, the pit was about 800 feet long and 300 feet wide with an approximately 150-foot face at the back. Cuts were started through it at the top, just wide enough for the Northwest 2½-cubic-yard shovel and the hauling equipment, which consisted of three 12-cubic-yard and two 13.8-cubic-yard bottom-dump Euclids. Lifts of from 25 to 35-foot maximum height were excavated in each through cut, the width of which increased, of course, as successive lifts cut deeper into the side hill. The material in the pit consisted of alternate streaks of cemented gravel, not quite tight enough to require blasting but hard enough to make digging difficult, and streaks of loose sand of approximately the same 6-foot thickness. Dipper teeth on the shovel had to be hard-surfaced. Early attempts to use a Caterpillar 42-inch elevating grader to supplement the shovel proved unsuccessful due to the alternate hard and soft streaks in the pit.

The Superintendent instituted a

(Concluded on next page)

er from your engines

Use this...
DETERGENT
DISPERSIVE
...Oil

FOR efficient performance under all conditions, from tropic heat to arctic cold, heavy-duty gasoline and Diesel engines need an oil that keeps engine parts clean, rings free, assures better compression, better combustion. *Texaco Ursa Oil X*** fills the bill precisely. It's both detergent and dispersive. It assures full power output, with greater fuel economy.

The properties of detergency and dispersion in *Ursa X*** play a major part in producing these benefits. Detergency keeps your engine clean. Dispersion holds deposit-forming materials in suspension until drained. In addition, *Texaco Ursa Oil X*** has properties that protect bearings against corrosion, prevent scuffing of rings, pistons and cylinders.

For effective lubrication of air compressors, use *Texaco Alcaid, Algol or Ursa Oil.* You'll assure wide-opening, tight-shutting valves, eliminate ring-sticking, reduce repair and replacement bills—get better performance at lower cost.

Put your lubricating problems up to Texaco Lubrication Engineering Service. Call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write: The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

NIGHT METROPOLITAN OPERA BROADCASTS SATURDAY AFTERNOONS

Grading Problems

(*Continued from preceding page*)

seven-day week, as he was not satisfied with the production of 1,600 yards averaged on each of the two 8-hour shifts. These were run 6 days a week from 4:30 a.m. to 9:30 p.m., all of which were daylight or semi-daylight hours.

The material was spread on the embankment in 8-inch loose layers by two Caterpillar D8 tractors with LeTourneau bulldozers, and the hauling equipment was routed over all parts of the newly spread layers to assure maximum compaction.

Greasing of the Euclids was done once during each shift by a mechanic and two grease men who pulled a Euclid out of the round and lubricated it in about 20 minutes. The shovel was lubricated thoroughly between shifts, in addition to which the oiler gave constant attention to parts which could be lubricated without shutting down. A Westinghouse FlexArc welder was maintained on the job for necessary repairs to equipment.

To reduce the dust menace on the haul road, a 1,000-gallon tank mounted on a Ford truck was kept in constant use during all working hours. This tank truck was supplied with water by a small centrifugal pump set on the bank of a nearby creek. Discharge of the water on the fill by gravity was controlled by a 6-inch valve at the rear of the truck. The water struck a 2-foot-square board hung horizontally under the discharge and this splashed the water in all directions to give satisfactory sprinkling. Upkeep costs on the hauling equipment were further reduced by constant blading of the haul road by a Caterpillar No. 12 grader.

The main excavation on this project, other than that in the borrow pit, was a drainage ditch along both sides of the embankment. This was done by a Bucyrus-Erie dragline using a Bucyrus-Erie ¾-cubic-yard bucket on a 40-foot boom. The usual procedure was to operate the dragline on mats on the line of the drainage ditch and side-cast the material directly into place on the outer slope of the embankment.

Major Bid Items

A list of the principal bid items on the four contracts follows:

Leonard & Slate Ltd. of Oregon

Clearing	22 acres
Grubbing	13 acres
Excavation, unclassified, 600-foot free haul	511,490 cu. yds.
Excavation, common	19,500 cu. yds.
Excavation, solid rock	105,460 cu. yds.
Overhaul, 600 to 1,200 feet	240,770 cu.-yd.-stas.
Overhaul, over 1,200 feet	12,430 M-cu.-yd.-stas.*
Selected roadway borrow, in place	17,750 cu. yds.

Erickson Paving Co.

Clearing	58 acres
Grubbing	31 acres
Excavation, common, 600-foot free haul	225,150 cu. yds.
Excavation, solid rock	270,520 cu. yds.
Excavation, unclassified	14,590 cu. yds.
Excavation for sand drains	6,500 lin. ft.
Gravel backfill	395 cu. yds.
Backfill for sand drains	760 cu. yds.
Selected sand borrow, in place	7,600 cu. yds.
Selected roadway borrow	22,390 cu. yds.
Overhaul, 600 to 1,200 feet	250,360 cu.-yd.-stas.
Overhaul, over 1,200 feet	4,267 M-cu.-yd.-stas.*
Finishing roadway	197 stas.

Strong & Macdonald

Excavation, solid rock	296,200 cu. yds.
Excavation, common	15,670 cu. yds.
Overhaul, 600 to 1,200 feet	241,825 cu.-yd.-stas.
Overhaul, over 1,200 feet	2,201 M-cu.-yd.-stas.*
Finishing roadway	104 stas.

Parker Schram Co.

Embankment in place	307,790 cu. yds.
Selected roadway borrow, in place	18,610 cu. yds.

*It is the standard practice of the Washington Department of Highways to provide for 1,000-yard stations of overhaul at a point where the bid price on cubic-yard-stations equals the price on 1,000-cubic-yard-stations.

Personnel

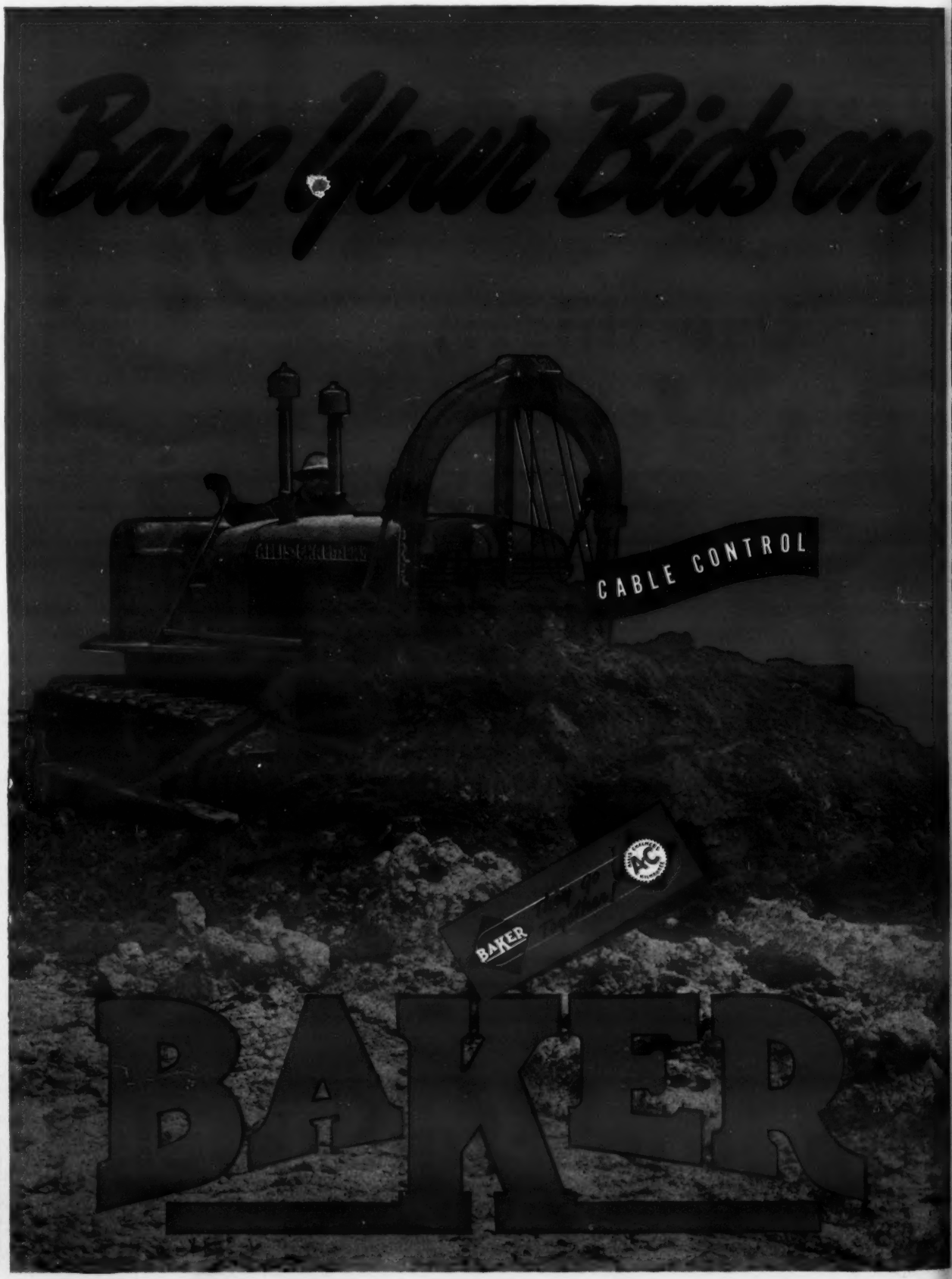
The contract to Leonard & Slate, Portland, Oreg., was awarded on December 5, 1944, for the low bid of $439,571.24 and 210 working days were allowed for its completion. Jack Ware was Superintendent on this contract. The second section was awarded to Erickson Paving Co., Seattle, Wash., on December 28, 1944, on its low bid of $442,591.57, with 210 working days allowed for completion. The work was done under the direction of Carl W. Erickson. The third section was awarded to Strong & Macdonald, Tacoma, Wash., on its low bid of $262,748.26 on December 28, 1944, with 180 working days allowed for completion and the contract was superintended by Jack Jensen. The fourth section was not awarded until April 17, 1945, to the Parker Schram Co., Portland, Oreg., on its low bid of $156,297.95 with 180 working days allowed for completion. This job was done under the direction of Superintendent J. L. Waring.

For the Washington Department of Highways, Clarence Shain, Director, all contracts were under the direction of the Vancouver District Office of which E. C. Simpson is District Engineer. The Resident Engineers in direct charge at the job site were J. H. Kline on the two southern sections, and E. G. Nettleton on the two contracts on the north end.

Ransome Blue Brute Dealers

The appointment of four distributors for its Blue Brute line of mixers and pavers has been announced by the Ransome Machinery Co., Dunellan, N. J. Two are in Michigan, and one each in Florida and California.

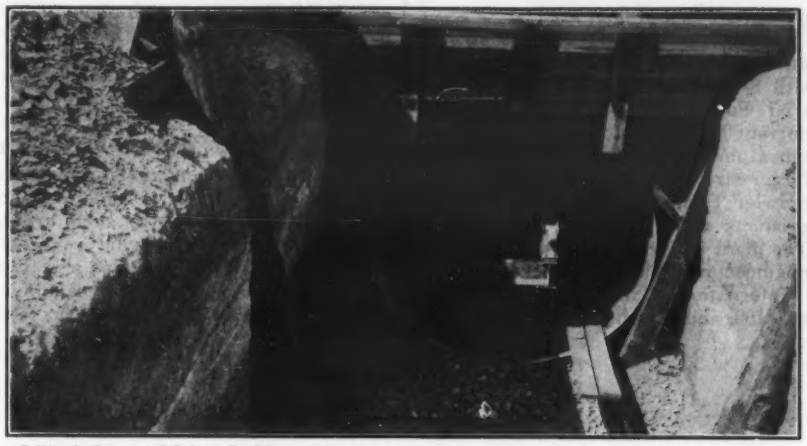
Thomas G. Abrams, 710 Meridan Drive, Dearborn, and the Lakeshore Machinery & Supply Co., 400 W. Laketon Ave., Muskegon, will serve as outlets in the Wolverine State. Service in Florida will be provided by Allied Equipment, Inc., 7511 N. W. Seventh Ave., Miami. The new California supplier is the Coast Equipment Co., 948 Bryant St., San Francisco 1.



Conveyor Conduits Of Metal Culverts

A saving of time and money has been reported by West Coast contractors who have been using conduits of Multi-Plate culvert sections and tunnel liner-plates for temporary or permanent conveyor tunnels. The conduit may be installed either above or below ground, with hatches left for the introduction of the sand, gravel, or other material to the conveyors placed within.

Shipped knocked down, the metal plates are readily assembled by bolting in the field. When the job is completed, they can be unbolted and removed. A 7½-foot tunnel of 12-gage Multi-Plate, used at McClellan Field near Sacramento by J. R. Reeves to serve the concrete mixing plant, was salvaged 100 per cent. At Radum Station, Calif., the Henry Kaiser Co. used Armco liner plates for a conveyor tunnel under four railroad tracks and a state highway, and Multi-Plates for the open trench beyond. The liner plates, made for assembly from the inside, are best for tunnel usage where daylighting is not practical. Shovels and wheelbarrows are used for the excavation, working inside the assembled tube.



California Corrugated Culvert Co. Photo
A materials tunnel of Multi-Plate under construction to serve J. R. Reeves' mixing plant at McClellan Field in California.

Hercules Advances Keane

LeRoy Keane, Manager of the Pittsburgh office of Hercules Powder Co., has been named to succeed C. C. Gerow as Director of Sales for the Explosives Department. Joining the firm in 1918, he served the Ohio territory before becoming Assistant Manager at Pittsburgh in 1932. He was made Manager there in 1936.

New York City Outlines Huge Highway Program

Plans for $285,000,000 of arterial highway and parkway construction have been revealed by New York City. The program calls for spending over one-third of this figure in 1946. Agreements have been reached with the Federal and state governments to provide substantial aid for the program, which is planned to carry through 1951. Figures appended to a report of the plans reveal that such aid would cut the City's share of the total cost to $170,000,000.

A Federal-state program, one of three parts in the overall plan, covers a five-year period and is to provide for the entire cost of construction of eight major expressways in the city, in addition to half the cost of acquiring the necessary land. Under this arrangement the City will contribute only $21,062,500 of the program's $128,570,000 total cost.

Projects to be undertaken in the first three years, and their costs, are: the Cross-Bronx Expressway, $38,670,000; the Van Wyck Expressway, to service Idlewild Airport in Queens, $13,250,000; the Brooklyn-Queens Expressway, $15,800,000; the Bronx River Expressway, $7,180,000; and the Deegan Expressway also planned for the Bronx, $25,070,000.

Scheduled for construction in 1949-50 are the New England Throughway in northeast Bronx, $6,285,000; the Prospect Expressway connecting Gowanus and Ocean Parkways in Brooklyn, $10,285,000; and Richmond Parkway in Staten Island, $12,030,000. The Bronx River Parkway southerly extension, a $7,000,000 project scheduled for construction in 1946-47, is to be financed entirely out of the State's Post-War Reconstruction Fund.

The remainder of the overall city program is made up of construction schedules to be financed by long-term bonds or assessments. The approaches and connections for the Brooklyn-Battery Tunnel in Manhattan, to be built in 1946, will cost $10,913,000. Other work, to cost $46,597,645 in 1946, will include Park Department items totaling about $3,600,000, most of them improvements to the Belt Parkway system in Brooklyn and Queens.

Other items are: Bruckner Boulevard in the Bronx, a $11,000,000 arterial link between the Triborough Bridge and the New England Throughway; the Boston Road improvement, $25,000,000; sections of the Brooklyn-Queens Expressway, not included in the Federal-state program, to cost $16,675,722; extending Manhattan's West Side elevated highway to the Battery, $1,443,195; East River Drive improvements and the Harlem River Drive, projects with an overall cost of $30,000,000; the Queens Midtown Expressway, $10,620,000; and five other projects bringing that Borough's program costs to $26,000,000.

Wire Institute Names Kauer

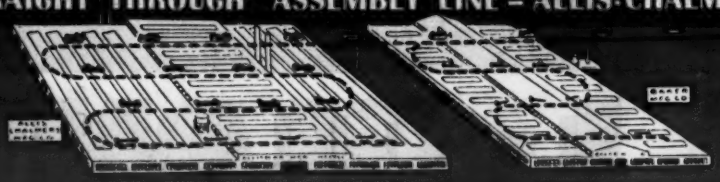
T. J. Kauer, former Assistant Managing Director of the American Concrete Pipe Association, has been named Managing Director of the Wire Reinforcement Institute, National Press Bldg., Washington, D. C. Coincident with this appointment, he was made Secretary-Treasurer of the organization. Previous to his Concrete Pipe Association post, Mr. Kauer had been with the Civil Aeronautics Administration and the Ohio Department of Highways.

Baker Bulldozers

Yes, successful bidders today, as before, know that when it comes to turning out yardage it's Baker every time. Hard hitting, powerful, dependable—teamed with Allis-Chalmers Diesel tractors, they set the pace on any job. Baker 'dozers are built exclusively for A-C tractors—cooperatively engineered, designed, tested and produced by two great leaders in their respective fields. That is why there is no compromise in design—no unbalanced performance—no adaptations required. That is why there are more Baker 'dozers on Allis-Chalmers tractors than all other makes combined

THE BAKER MFG. CO., SPRINGFIELD, ILLINOIS

"STRAIGHT THROUGH" ASSEMBLY LINE – ALLIS-CHALMERS TO BAKER TO YOU!



The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops adjoins the Allis-Chalmers crawler tractor plant. When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.

International Harvester Acquires Chicago Plant

The Industrial Power Division of the International Harvester Co. has announced the acquisition of a new factory in suburban Chicago, to be known as the Melrose Park Works. Formerly operated by the Buick Division of General Motors in the manufacture of Pratt & Whitney aircraft engines, the property includes about 135 acres of land and modern manufacturing and office buildings having approximately 2,000,000 square feet of floor area.

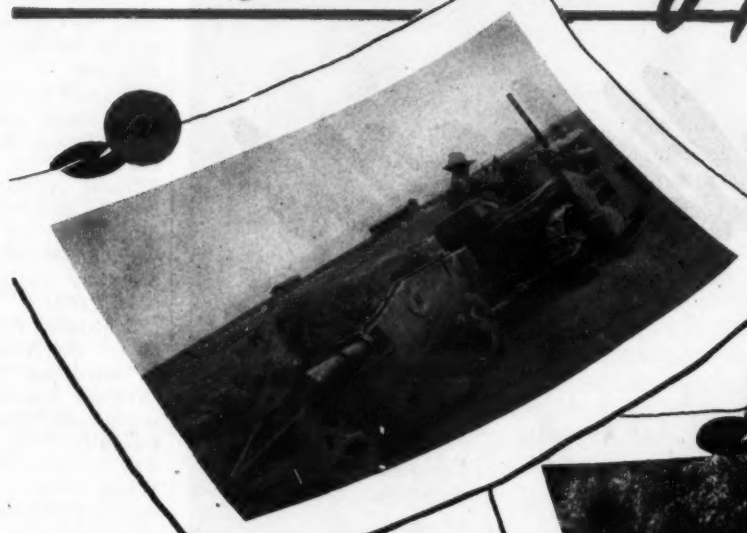
Together with the Milwaukee Works and the Tractor Works, the new factory will be used in manufacturing Industrial Power Division products. The current line of International diesel engines, one size of gasoline engine, 2 new larger-size diesels, and a new large crawler tractor will be the principal products of the Melrose Park Works. The plant will also house the Division's engineering department.

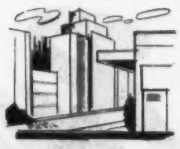
International's new diesels will be in the 100 and 200-hp range. The new crawler tractor is to weigh about 36,000 pounds, and is to have a 130 drawbar hp.

Frequent Mowing Reduces Roadside Weed Problem

The presence of noxious weeds on turfed roadsides adds considerably to the mowing problems in such areas, since more complete mowing is necessary to maintain a well tended and tidy appearance. The Virginia Department of Highways has found that constant mowing, while it may be somewhat costly at first, tends to discourage weed growth and promotes the development of a uniform grass sod. This frequent mowing in the early stages of a roadside project more than justifies itself later on, because once a uniform grass sod is established, weed growth is negligible and mowing operations are reduced to a minimum. It is the hope of the Department ultimately to develop a low-growing uniform grass sod, so that mowing can be reduced to twice a year, or even once a year in some areas.

these war-born ...do scores of peacetime jobs...



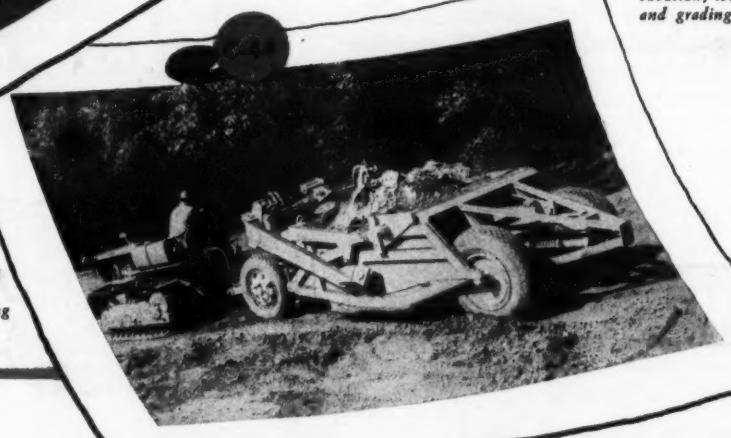


. . . for counties and states

These little 2 and 4-yard outfits are just what you need for ditching and shoulder work . . . for widening and maintaining roads and driveways . . . for repairing small slides and washouts . . . and for countless other jobs, such as filling in around culverts, bridge abutments, etc.

. . . for small contractors

Good news indeed for thousands of small contractors who have been looking for a low cost, easily transported rig that will enlarge their job opportunities and profit range on all kinds of light excavation, levelling, stripping and grading work.



. . . for farmers

On farms and large estates these thrifty little outfits will pay for themselves in a hurry —building roads and soil-saving dams, filling in feed lots, digging stock ponds and irrigating ditches, levelling off uneven ground, etc.

BRIEF SPECIFICATIONS

	Model C-22	Model C-24	Model C-42	Model C-44
Capacity	1¾—2 Yds.	1¾—2 Yds.	4—5 Yds.	4—5 Yds.
Tractor	Rubber-Tired	Crawler	Rubber-Tired	Crawler
Type	Tilting Bowl Front Dump	Tilting Bowl Front Dump	Positive Forced Ejection	Positive Forced Ejection
Length	13′	16′4″	12′9½″	17′
Width	71″	71″	92¾″	92¾″
Weight	2550 lbs.	2800 lbs.	6200 lbs.	6500 lbs.

low in cost . with either

ESTIMATED YARDAGE TABLE

● Here's a reasonable estimate of the number of yards moved per hour by LaPlant-Choate C-22 and C-42 scrapers behind high speed rubber-tired tractors of 22-28 DHP and 40-50 DHP respectively. Yardage is based on self-loading in good scraper material, with properly maintained haul roads.

Model	LENGTH OF HAUL IN FEET								Load, Turn and Dump Time	Pay Yards Per Trip
	200′	300′	400′	500′	600′	800′	1000′	2000′		
C-22	38	32	29	26	24	22	21	17	1.5 Min.	1.75
C-42	69	59	55	52	50	46	44	32	1.75 Min.	3.75

Watch for More Great News!

● This is only one of a series of important announcements designed to bring you pertinent facts about LaPlant-Choate's great new earthmoving line—including many new and outstanding developments in cable and hydraulic operated scrapers, hydraulic dozers, cable and hydraulic power control units—*plus* a new "surprise" in high speed, big capacity earthmoving rigs. So before you start lining up new equipment for tomorrow's jobs, be sure to see the new LPC's—created by LaPlant-Choate's extensive war-time experience and "seasoned" by over a third of a century of engineering and manufacturing "know-how."

We'll be seeing you at the AED Convention, Chicago, Jan. 27-30.

LaPLANT *Engineered*

Concrete-Form Ties Described in Booklet

Details on the use of Richmond Snap-Tys in concrete-form construction are illustrated and outlined in a 12-page booklet available from the manufacturer of these ties and other concrete-form accessories. Diagrams and cross-sectional drawings show the various features and step-by-step application of the Snap-Tys. Other design and operational data are presented.

Copies of this Snap-Ty booklet, together with a current price list of the Richmond line of concrete-form supplies, may be secured by addressing the Richmond Screw Anchor Co., 816-838 Liberty Ave., Brooklyn 8, N. Y., and mentioning this notice.

Richkraft Dealers Named

The appointment of general distributors for New York State, Vermont, and part of Massachusetts has been announced by the Richkraft Co. of Chicago, Oakland, Calif., and Westport, Conn.

The Lee Storey Insulation Co., 997 Grand St., Brooklyn, will serve as Richkraft outlet in the New York counties of Kings, Queens, Richmond, Nassau, and Suffolk.

The Mohawk Building Materials Co., Rensselaer, N. Y., will serve the counties of Franklin, Clinton, Essex, Warren, Saratoga, Rensselaer, Columbia, Albany, Schoharie, Fulton, and Hamilton in New York; the entire state of Vermont; and Berkshire County in Massachusetts.

Gellhorn Resumes Duties At Worthington Corp.

The Worthington Pump & Machinery Corp., Harrison, N. J., has announced the return of George Gellhorn to his position as Export Manager. Mr. Gellhorn, who has been placed on the Navy's inactive list after three years' service as a Commander, spent 45 hours in the water when the USS Gambier Bay, of which he was Navigation Officer, was sunk by enemy fire in the battle of Leyte Gulf.

"baby" scrapers ...faster... cheaper... better!

. . . for big contractors

Even large contractors will find it profitable to employ several of these little "commandos" for handling ditching and finishing jobs — and for getting in and around dozens of spots where the use of bigger outfits is often impracticable.

. . . for general utility

Besides saving time and money on hundreds of light earthmoving jobs around parks, golf courses, cemeteries and industrial properties, these little machines can also be used effectively for removing snow, leaves, etc.

. . . for railroads

Small . . . sturdy . . . maneuverable, these "baby" LaPlant-Choate scrapers provide an economical answer to the problems of cleaning ditches along right-of-way, bank sloping, repairing roadway breaks, distributing ballast — and a "101" other utility jobs.

simple to operate . . . readily adaptable for use crawler-type or high speed rubber tired tractors

Now, for the first time, you can get these amazingly efficient 2 and 4-yard scrapers, fitted for use with either crawler or high speed rubber tired tractors—*at a price within the most modest budget.* Developed especially for the U. S. Airborne Engineers, and used by the hundreds on military projects all over the world, these "baby" LaPlant-Choate scrapers are now ready to help you speed work and reduce costs on a wide variety of peace-time jobs.

Whether you select the inexpensive *2-yard* design with gravity dump, or the larger *4-yard* model with positive forced ejection and controlled spreading, remember both are easily adapted for use with tracks or rubber. Both are equipped with LPC's *improved* single unit hydraulic system for faster, more dependable operation. Both are skilfully engineered to move earth at the *lowest possible cost per yard* within their respective job ranges. So for better results and bigger profits *tomorrow*, get complete facts *today* on these two great new LPC "Carrimors". Just address: LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; San Leandro, Calif.

LA CHOATE Earthmoving

owest ossible ost per yard

Rural-Road Mileage 94 Per Cent 2-Lane

Of the 333,000 miles of primary rural highways in the United States, only 6 per cent has more than two traffic lanes, Charles M. Upham, Engineer-Director of the American Road Builders' Association, reported recently. In 1943 there were only 20,879 miles with more than two lanes, 14,661 of which had three lanes. The latter can be extremely dangerous when approaching full capacity, he pointed out.

America's mileage of highways with more than two lanes is far more limited than most people realize, and much of this is not of a high-type surface, he continued. Only five states, Kansas, Minnesota, Nebraska, New York, and Texas, have over 1,000 miles each, the greater part of which is of the three-lane variety. Kansas has only 93 miles of four-lane or more; Minnesota, 253; Nebraska, 31; New York, 567; and Texas, 617.

The country has 5,191 miles of four-lane highways, 736 miles of five-lane, and 291 miles of six-lane, in the primary rural system. This does not include the 28,932 miles of urban highways which are extensions of the primary rural routes. Many of these multiple-lane highways have low-type surfaces.

Streamlined Clamps Lock On Hose; Other Fittings

The Punch-Lok clamp is a mechanical device for connecting fittings, nipples, menders, or pipe to a hose, for splicing electric welding cable, and for many other uses. Its applications range from air and water hose, through flexible couplings for bituminous material and other hot liquids, to the repairing and reinforcing of split lumber. The clamp is applied in such a manner that it is locked while under tension, and the excess band cut off to present a streamlined joint for safety.

A new catalog issued by the manufacturer of Punch-Lok illustrates some of its applications, and serves also as an operating manual for the Loking tools, as well as a guide for adapting the clamps to various uses. Specification charts list the sizes and types of preformed or open-end clamps, and various fittings for use with Punch-Lok clamps are also shown.

Copies of this combination catalog-manual, Form 108E, may be obtained by readers of CONTRACTORS AND ENGINEERS MONTHLY who write the Punch-Lok Co., Dept. I, 321 North Justine St., Chicago 7, Ill.

Lincoln Electric Co. Marks 50th Anniversary

Tribute was paid recently by the employees of the Lincoln Electric Co., Cleveland, Ohio, to John Cromwell Lincoln, founder of the firm and Chairman of its Board of Directors, on the company's Golden Jubilee. One of today's large producers of arc welding equipment, the company was organized fifty years ago with a capital of $150.

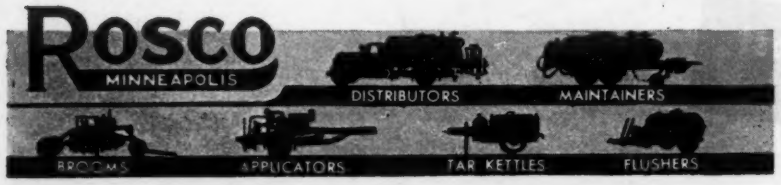
The success of highway, street and airport construction and maintenance depends largely on MEN and MACHINES. Our objective is to produce machines of dependability and performance to protect your reputation.

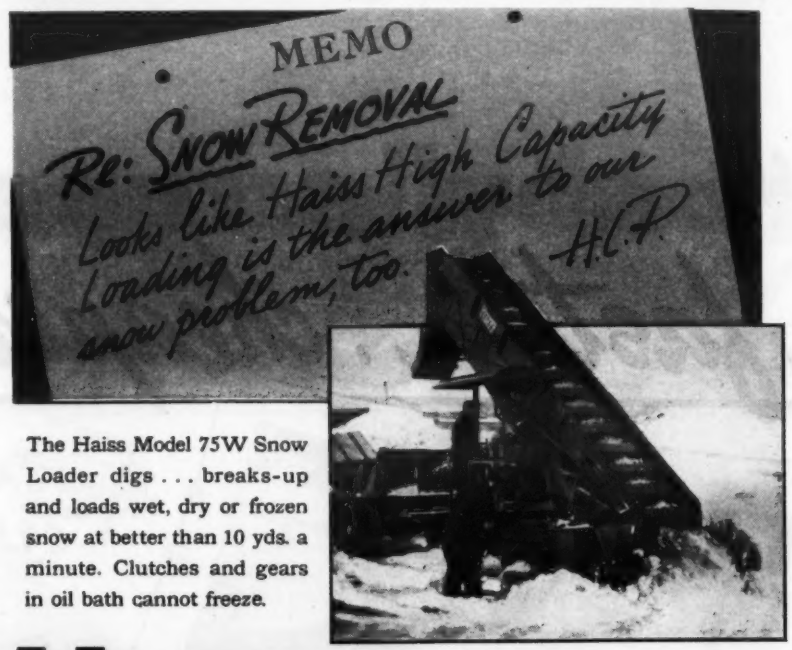
THE ROSCO BITUMINOUS DISTRIBUTOR now in use on both continents, makes new friends every day. It provides *coverage where coverage counts.* The Pressure Control Method accurately applies bitumen from as little as 3/100 gallons per square yard and up. And it automatically compensates for any changes such as application rates and spraybar length.

The Rosco Master Control Valve serves you these seven ways: Starting spray . . . circulating . . . loading . . . transferring . . . pressure control . . . clean out . . . no-drip cut off. The front mounting of this valve, along with engine and pump, provides a safe, roomy rear platform, and balances the load. The folding type spraybar, also original with Rosco, is equipped with four sections, vertical lift and shift and horizontal bar pivot. These and many other features are explained in Rosco literature. See your Rosco dealer, or write us for details.

ROSCO MANUFACTURING CO.
3118 SNELLING AVE. • MINNEAPOLIS 6, MINNESOTA

ALLIED EQUIPMENT DISTRIBUTORS ASSOCIATION MEMBER





The Haiss Model 75W Snow Loader digs . . . breaks-up and loads wet, dry or frozen snow at better than 10 yds. a minute. Clutches and gears in oil bath cannot freeze.

HAISS

Catalog on request
GEORGE HAISS MFG. CO., INC.
142nd St. & Canal Place
New York 51, N.Y.

- Self-equalizing double arm lift.
- Low uniform oil pressure.
- Hoist lifts well ahead of center of body.
- Sturdily built hoist sub-frame.
- All pumps equipped with Torrington needle bearings and phosphor-bronze wear plates.
- Safety feature in valve prevents accidently dropping body.
- Cast manifold permits mounting of pump from one side to the other without additional parts.

No "drafting board dream" is the Marion Hydraulic Hoist. It is a sturdy, long life, trouble-free unit designed by Marion engineers right on the job under actual working conditions.

See Marion for a complete line of standard and special-built equipment. There's a Marion Body and Hoist for every hauling job.

MARION METAL PRODUCTS CO.
MARION, OHIO
See Your Distributor or Write

Low-Cost Road Work With Shale and Chat

County Plans Program Of Improvement Using Red Shale as Base With Chat Cover; Then Oiled

By W. T. NIGGEMANN, County Engineer and Surveyor, Crawford County, Kansas

✦ CRAWFORD County, Kansas, in the southeast corner of the state, is in the heart of old deep-mine coal operations which have been changed to strip-mining since World War I. A total of 3,262,672 tons was produced by huge draglines and electric shovels in 1944. County finances have been at low ebb the past few years but, in spite of a small road and bridge fund, Crawford County has had an insistent demand for higher-type roads because of these mining operations and two large chemical plants in the county which require heavy truck and bus transportation every day.

The county highway system comprises 227.5 miles of road of which 17.0 miles are paved, 22.5 miles are blacktopped, and 188 miles are surfaced with chat and shale. At the present time, Crawford County is contemplating the adoption of the unit system which would add 900 miles of town roads and numerous small bridges to the county road system, but would also automatically increase the road funds.

Road Construction

In order to meet the demands of heavy wartime traffic during the past years, the County has been experimenting with red shale in various sections where holes had developed in the road base. Neither chat nor rock would stand up satisfactorily under the heavy traffic, but the red shale has been found highly suitable for this purpose and it is now used extensively for base.

A ⅜-cubic-yard Austin-Western Badger shovel was purchased in order to keep the cost of handling the shale at a minimum. Trucks haul the red shale to the road where it is dumped in stockpiles along the shoulder at the rate of 2,500 cubic yards per mile. The larger rocks are hand-sledged in the stockpiles into suitable size or spalls. Then an International TD-18 tractor with an Adams power-controlled grader and a Caterpillar motor grader spread the material to a uniform depth over the prepared road bed. Following this a sheepsfoot roller is used to break the oversize rock in place and to create a fine mulch on the surface so that the road can be opened for traffic.

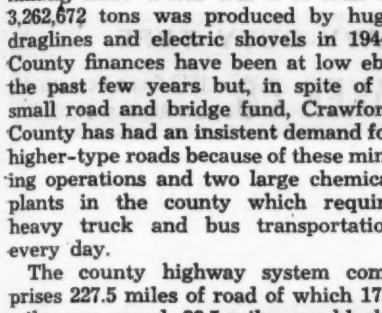
About 250 cubic yards of chat per mile is then applied so that a maintainer may have enough loose material to keep the road in condition. The road is left open to traffic for several weeks, the length of time depending on weather conditions. The traffic and moisture tend to compact the mulch and stone to a solid surface. In order to speed the compaction, a 10-ton tandem power roller is run over the road daily to give a hard surface for black-topping. After the red-shale base has been suitably compacted, 100 pounds of mine chat to the square yard is placed, following which a gallon of RC-3 road oil per square yard is applied. Road maintainers are used to blade-mix the chat and road oil and finally spread it evenly over the 20-foot width of the road, after which it is rolled by the 10-ton tandem.

Crawford County, Kans., uses its Austin-Western Badger ⅜-yard shovel to load shale for road base.

This surface is sealed with 0.25 gallon of asphaltic road oil per square yard covered with 18 pounds of mine chat per square yard. The road surface and seal give a 1-inch mat when completed.

With this low-cost type of construction Crawford County plans in the

(*Concluded on next page*)



THE STRONGEST GEARED POWER FOR ITS WEIGHT IN THE WORLD

ALL STEEL HAND HOIST Bros.

SEATTLE, U.S.A.

The Biggest Little Hoists in the world for use where power is not practical, available, or sufficient.

2-Ton "Lightweight"	75 ft.	⅜"
5-Ton "General Utility"	250 ft.	½"
15-Ton Triple-Geared "Special"	1200 ft.	⅝"

With patent gear change and positive internal brake that never fails, and will lock load.

Gear Ratios	Weight	Price
2-Ton 4 & 22 to 1	60 lb.	$ 50
5-Ton 4 & 24 to 1	110 lb.	75
15-Ton 4, 19 & 100 to 1	480 lb.	250

BEEBE BROS.

2724 6th Avenue So., Seattle 4, Washington

Dealers in all Trade Centers

Rugged Enough FOR THE DIVE BOMBER

VICKERS HYDRAULIC CONTROLS

ALSO make Construction Equipment MORE DEPENDABLE

When a dive bomber pilot pointed the nose of his plane at the target and began that lightning-like dive, his life and hitting the target depended on the plane's controls. Vickers produced the dependable power hydraulic controls which, in spite of difficult weight limitations, met these exacting dive bomber standards. Vickers also produced dependable controls for many other types of important war implements.

Dependable controls are vital in construction equipment too. While life and the turn of battle do not depend on them, many other factors of importance do.

Vickers Power Hydraulic Controls for construction equipment have the same dependability which met the crucial test of battle in war machines on every front. These controls will take all the smashing, pounding shocks that construction equipment must withstand. They are simple, flexible, inherently self-lubricated, rarely need maintenance . . . assure immediate response to "finger-touch" on the operating lever, no matter how heavy the job.

Specify Vickers Power Hydraulic Controls . . . and get the most modern, fast-working construction equipment.

VICKERS *Incorporated*

1492 OAKMAN BLVD. • DETROIT 32, MICHIGAN

Application Engineering Offices: Chicago • Cincinnati Cleveland • Detroit • Los Angeles • Newark • Philadelphia Rochester • Rockford • Tulsa • Worcester

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

Low-Cost Road Work With Shale and Chat

(*Continued from preceding page*)

future to build up a system of surfaced roads within the funds levied for roads and bridges.

Equipment

For maintenance, Crawford County has two Caterpillar No. 11 diesel-power graders, one Austin-Western No. 99 power grader, and one Adams leaning-wheel grader. To handle such construction as is done by the County, the equipment roster includes an International TD-18 tractor with an Adams power-controlled grader, an Allis-Chalmers S-O tractor with a 6-cubic-yard LeTourneau scraper, the Austin-Western Badger ⅜-cubic-yard shovel, a Topeka Hiway mower, 2 Rex 1-bag mixers, a Chevrolet bridge truck, 2 Ford and 3 Chevrolet 1½-ton dump trucks, 2 Ford ½-ton pick-up trucks, and 2 Ford ½-ton panel trucks.

The central garage is located at the county seat, Girard, which is in the center of the county. All maintenance and construction equipment works out of this garage, except for the four power graders which are spotted about the county, as it is more convenient and economical to maintain the roads from those points.

Bridges

Crawford County is fortunate in not having any large rivers flowing through or along its borders. Most of the larger streams rise in the center of the county and drain in four directions. Therefore, bridge problems are at a minimum as far as long spans are concerned. There are a number of 70-foot-span steel bridges on the county road system, and these are still in good condition.

The bridges are maintained from the county garage by a special bridge crew which consists of a foreman and six laborers with a truck specially equipped for construction and maintenance. There are five bridges in the county which should be replaced and plans are being made to rebuild them in the early post-war years.

County Organization

Crawford County has an area of 592 square miles and a total population of 45,429. The three County Commissioners are elected for four-year terms. One commissioner is held over at one election and at the next general election two are held over so the Board always has one continuing member who has a knowledge of county affairs. The present Commissioners are D. J. Saia, Chairman, Irwin Bolze, and August Dorchy.

The County Engineer for Crawford County is appointed by the Board of County Commissioners for a one-year term. The author, the present County Engineer, has been in office for three years, and has charge of all highways in the county as well as the employees and equipment used on the road system. The Commissioners and the County Engineer belong to the Southeast Official Council and regularly attend the quarterly meetings in the District.

New du Pont Branch Mgrs.

The retirement of two Managers of branch offices of the Explosives Department of E. I. du Pont de Nemours & Co., Wilmington, Del., was announced recently. John J. Heffernan has retired as Manager of the Joplin, Mo., office, a post he held since 1934, while Edmund T. Lednum has retired after 17 years as Manager of the Chicago office.

Mr. Lednum became a salesman for the southwest district of the firm in 1904. He was shifted to the Chicago office in 1908, and became Joplin Branch Manager in 1916. In 1918 he assumed the post of Manager of the Denver office, leaving this position for the Chicago job in 1928. He has been succeeded by his assistant, Gilbert H. Smith.

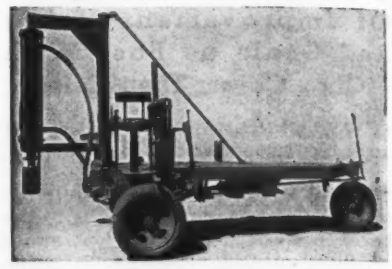
Mr. Heffernan joined du Pont as Special Assistant in the sales division in 1928, having been formerly Sales Manager for the Grasselli Powder Co., Cleveland. He served as Manager of the St. Louis office before assuming his Joplin post. Mr. Heffernan has been succeeded by Robert O. Cash, Assistant Manager at Joplin since July.

New Lincoln Officials

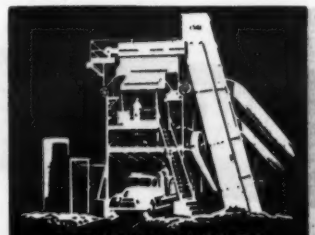
Two members of the staff of the Lincoln Electric Co., Cleveland, Ohio, have been named Vice Presidents of the firm. H. F. Kneen, General Plant Superintendent since 1931, is now Vice President in charge of manufacturing, and G. G. Landis, a director and Chief Engineer since 1930, is Vice President in charge of engineering.

Junior CONCRETE RAPID PAVEMENT BREAKER

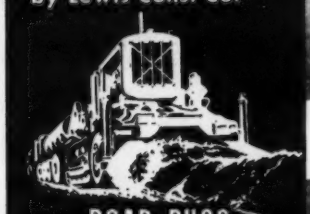
Fastest Pneumatic Method
Cuts Cost and Time
Works Inside or Out
Good for all Small Jobs



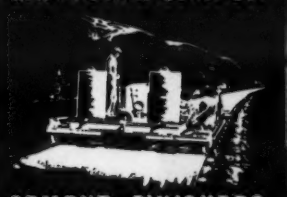
Ask about our HEAVY-DUTY TYPE
RAPID PAVEMENT BREAKER CO. 1517 Santa Fe Avenue Los Angeles 21, Calif.



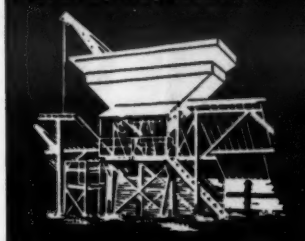
ASPHALT PLANTS
Cap.—125 tons per hr. Record reported—2414 in 12 hrs. (201 tons per hr.) Marine Base at El Toro, Calif. by Lewis Cons. Co.



ROAD PUGS
Cap.—200 to 550 tons per hr. Record reported—7920 tons in 20 hrs. (396 tons per hr.) Phoenix Cons. Co.



CEMENT FINISHERS
Cap.—300 lin. ft. per hr. Record reported—3065 lin. ft. in 8-hr. (383 ft. per hr.) Albany, Ore. by Roy Houck.



AGGREGATE BATCHERS

ROLL-TAMP COMPACTORS

The Mads[illegible] of bituminous mixing plants, the [illegible]t complete offered by any manufactu[illegible] includes: Asphalt Plants in 6 [illegible]- to 6,000-lb.), Oil-Mix Plants in 5 [illegible] (1,000- to 6,000-lb.) and the Road P[illegible].

WANT TO SPEED UP ROAD CONSTRUCTION?

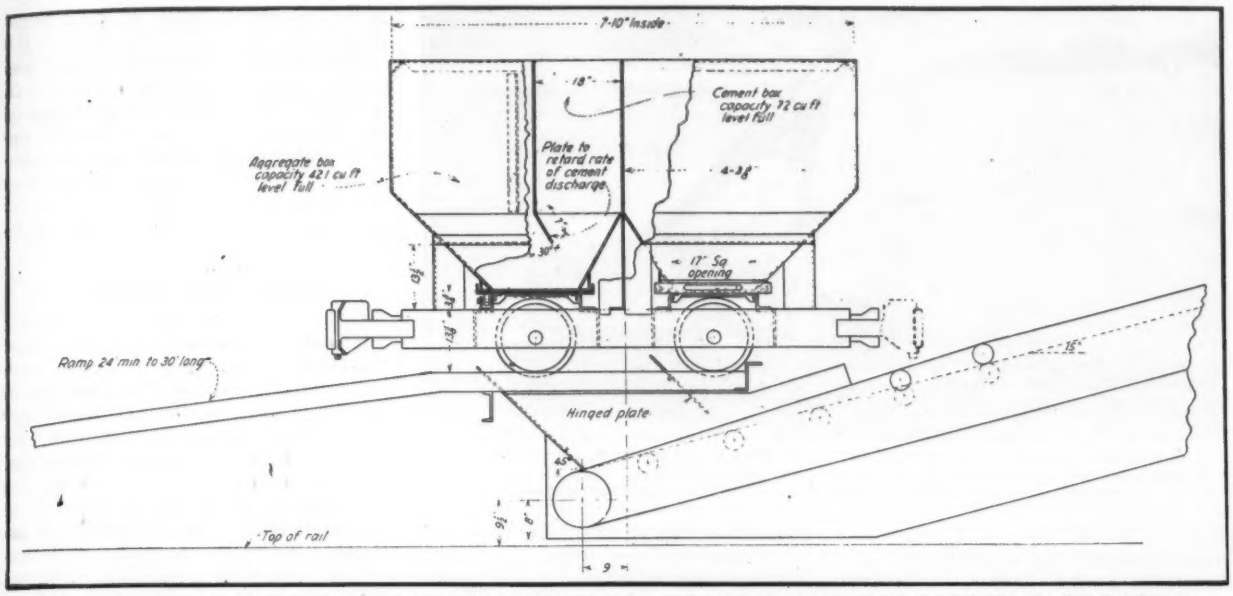
The Madsen Road Pug with the highest single-pass mixing capacity of any travel plant is revolutionizing secondary road construction methods.

[illegible]nnson Float Finisher makes a [illegible]other finish fasterthan possible by hand or by any other type of mechanical finisher.

...GET THE LOWDOWN

Write for Catalog

MADSEN IRON WORKS
HUNTINGTON PARK, CALIFORNIA



Both contractors on the Alva B. Adams Tunnel use this same car and conveyor arrangement for bringing in dry batches to the mixer in the "string" in the tunnel.

six trains are needed on the east side and two or three on the west side to keep up with placing operations. A movable or California switch is used at the site of the work for switching full cars to and empty cars from the unloading equipment. Battery locomotives are employed in switching.

Forms

The setting of invert forms was the controlling factor in the progress made in the placement of the invert lining. Close quarters and limited working space made placement of invert concrete possible only on a one-shift basis. The other two shifts of the day were employed to set forms, prepare the tunnel floor to receive concrete, and to strip forms and cure concrete. Operations were on a six-day-per-week basis.

On the east end of the tunnel, wooden forms were used. On the west end, 6-inch paving forms set at an angle of 33 degrees from the vertical were employed. The paving forms were held in

(*Continued on next page*)

A 13-Mile Tunnel

(*Continued from page 2*)

from the tunnel portal. Aggregate is end-dumped from trucks into a road-level hopper and fed from the hopper by a pan-type feeder to a 24-inch Barber-Greene belt conveyor. The conveyor elevates the material to the top of the batching plant, where it is discharged into a swiveled chute for deflection into any one of the three aggregate batching bins; sand, 3/16 to ¾-inch, or ¾ to 1¼-inch.

Cement delivered to the east-portal batching plant by truck is end-dumped into a receiving hopper in the cement unloading shed to the right of the batching plant. A 10-inch-diameter screw conveyor below the hopper moves the cement to a bucket elevator by which it is raised to a chute for delivery to the circular 1,500-barrel cement storage and batching bin.

Both plants proportion the materials by weight in manually operated batching hoppers. The aggregate hoppers are of the cumulative type; a separate hopper is employed in batching the cement. After materials have been batched, they are manually released and fall by gravity into specially designed cars. Each car is divided into two compartments, with individual containers for the cement. Each compartment, therefore, contains the dry ingredients for a cubic yard of concrete.

Transportation of Materials

The dry batched concrete materials are transported in the specially constructed batch cars to the site of the work in the tunnel. On the east side, trains consist of 6 cars, and are pulled by 8½-ton Atlas electric-battery locomotives. On the west side, both electric-battery and diesel locomotives are employed and, because of the downhill haul, pull 8 to 15 cars of material per train. Passing of trains within the tunnel is possible by use of sidings spaced at intervals.

Both contractors employ 30 to 32 batch cars in the work, meaning that

COMPLETE
WELL POINT SYSTEMS
WILL DRY UP ANY EXCAVATION
Faster—More Economically
Write for Job Estimate and Literature
COMPLETE
MACHINERY & EQUIPMENT CO., Inc.
Dept. C
38-40 11th St., Long Island City, N.Y.
Tel. IRonsides 6-8600

THE CLUTCH THAT STOPPED CLUTCH TROUBLE

Here is the one truly modern clutch for all heavy duty industrial drives.

It controls power and torque through a cushion of air—with as firm a grip or as light a grip as the job requires. It has no springs, arms, levers or toggles—requires *no* lubrication and little maintenance.

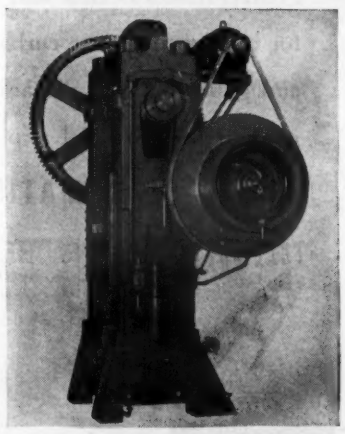
It is the Fawick Airflex Clutch—proved for superior performance and economy—in hundreds of industrial applications and in thousands of Diesel-driven Navy ships.

Let us help you engineer clutch trouble *out* of your machines. Book on request.

Oil-well drilling rig—equipped with 11 Fawick Clutches.

Steel rolling mill Fawick-equipped for smooth, even power.

Modern power shovel gives full-time operation through dependable Fawick Clutches.



◄ Heavy duty press has smooth starts and quick stops with Fawick Clutch and Brake.

Alligator shear operates through Fawick Clutch and Brake. ►

FAWICK *Airflex* CLUTCH

FAWICK AIRFLEX CO., INC. • 9919 Clinton Road, Cleveland 11, Ohio

A 13-Mile Tunnel

(*Continued from preceding page*)

place by a special steel anchor attached to steel pins set in holes drilled into the rock of the tunnel wall.

In alignment and grade, forms were first set approximately from points previously established and painted on the right tunnel wall. After some 200 feet of forms had been approximately set, piano wire was stretched for precise line, and levels used in establishing precise grade. Forms were blocked up to establish grade. Spreaders were installed and shores placed to establish line. A Coffin jack was employed to pull opposite longitudinal form sections together against the spreaders and the jack was not removed until shoring and blocking had been finally accomplished.

Collapsible steel forms designed and fabricated by the Blaw-Knox Co. are employed by both contractors in lining the arch and side-wall portion of the tunnel. The assembled form is complete with electric conduit, outlets for illumination, and convenience outlets for electrically operated equipment. Hatchways are provided in the forms at 5-foot centers in the crown of the arch and at 10-foot centers in the side wall, slightly below the spring line.

A form-shifting traveler, or jumbo, is employed in stripping, shifting, and setting the arch and side-wall forms. Establishment of line and grade for these forms is more or less automatic. The forms are very rigid and if the distance across the spring line is adjusted until correct, by means of steel wedges placed between form apron and anchor-bolt assembly, the form is in its proper place.

Unloading, Mixing, and Placing

The unloading, mixing, and placing equipment, or so-called "string", is mounted on trucks to fit the 24-inch-gage tunnel track. The individual units of the equipment are interconnected and can be moved as a unit on the track by means of electric locomotives or by a winch mounted on the equipment and a cable attached to the track.

The "string" consists of five individual units: (a) an inclined track leading to the batch-car unloading hopper, the first or 30-inch transfer conveyor, 33 feet in length and powered by a 10-hp electric motor, and a 1-cubic-yard transfer hopper; (b) a second or mixer conveyor, similar in size to the first conveyor and powered by a 7½-hp electric motor; (c) a 1-cubic-yard mixer; (d) a third or Pumpcrete charging conveyor, a 30-inch belt powered by a 10-hp motor; and (e) the Pumpcrete machine, including a 2-cubic-yard horizontal re-mixing drum and pump mechanism. An air winch was mounted on trucks and attached to the chassis of the Pumpcrete for use on the east end of the work in pulling a slip-form or strike-off in the placement of the invert lining. An electric winch mounted behind the mixer accomplished this work on the west end.

S. S. Magoffin, contractor for the east end of the Alva B. Adams Tunnel, uses an Athey MobiLoader on a Caterpillar D4 for transferring aggregate from stockpiles to trucks which carry 4 to 5 cubic yards per load to the batching plant.

On the east end, dry batched concrete materials are delivered to the unloading, mixing, and placing equipment by battery locomotives. The batch cars are then pulled up the incline track and spotted over the unloading hopper by electric hoist and cable. On the west end a battery locomotive is employed to push batch cars up the incline and spot them over the unloading hopper.

Material dumped from the cars into the hopper flows by gravity directly onto the transfer conveyor which elevates it to the transfer hopper. This hopper is utilized in the operation in order that a batch of material can be available for mixing while the empty car over the unloading hopper is being removed and another load spotted.

From the transfer hopper the dry batch flows to the mixer-conveyor, thence to the mixer. Water for use in the lining concrete is piped into the tunnel from the portals. After the water for mixing has been added and mixing has been accomplished, the concrete is discharged onto the Pumpcrete charging conveyor and elevated to the horizontal re-mixing drum of the Pumpcrete.

This drum is fitted with spiral fins welded solidly to the inside. The fins, in addition to providing further mixing of the concrete, also force it towards the front end of the drum and into the valve of the Pumpcrete. Concrete delivered to the pump is then forced through a 7-inch-diameter spiral-welded pipe to the forms.

Invert-Lining Operation

Concrete was delivered to the invert forms on the east side through standard 7-inch Pumpcrete pipe provided with toggle-type couplings. The pipe was in 5 and 10-foot lengths and was supported 4 to 5 feet above the tunnel floor on steel tripods. Concrete discharged from the pipe into the invert forms fell a distance of approximately 4 feet to the tunnel floor and was allowed to pile up where it fell until the peak of the inverted cone thus formed had reached the discharge line. A 10-foot section of

(*Continued on next page*)

By placing your order for Steel Forms with us now, we can reserve the necessary steel for your spring requirements and we can make delivery on time.

If you delay, *the steel may not be available*, and we will be unable to assure you satisfactory delivery.

Heltzel makes flexible and rigid steel forms for building concrete curbs, combined curb and gutter or sidewalk, also steel forms for modern highway and airport construction.

FULL INFORMATION HERE!

B-19 STANDARD ROAD FORMS · B-19-A DUAL ROAD FORMS · A-20-F STREET FORMS

Send for your copies; mailed promptly upon request

Heltzel
BUILDS IT BETTER

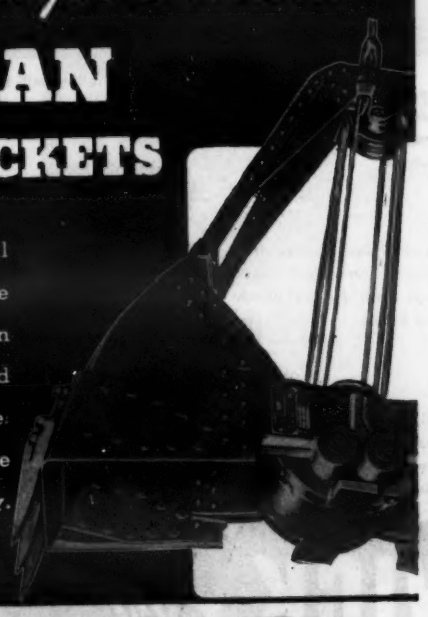
BINS, Portable and Stationary
CEMENT BINS, Portable and Stationary
CENTRAL MIXING PLANTS
BATCHERS (for batch trucks or truck mixers with automatic dial or beam scale)
BITUMINOUS PAVING FORMS
ROAD FORMS (with lip curb and integral curb attachments)
CURB FORMS
CURB AND GUTTER FORMS
SIDEWALK FORMS
SEWER AND TUNNEL FORMS
CONCRETE BUCKETS
SUBGRADE TESTERS
SUBGRADE PLANERS
TOOL BOXES
FINISHING TOOLS FOR CONCRETE ROADS

HELTZEL STEEL FORM & IRON CO. WARREN, OHIO · U. S. A.

Welded for Strength & Service

WELLMAN
Williams BUCKETS

Welded Rolled Steel construction builds longer life and greater utility into Wellman buckets. Multiple Rope and Power Arm types. Dragline Power Wheel. Special Service Buckets. ⅜ to 16½ yd. capacity.



Send for Bulletin

THE WELLMAN ENGINEERING CO.
7012 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in Principal Cities

A 13-Mile Tunnel

(*Continued from preceding page*)

pipe was then removed and the concrete was shoveled to low spots and vibrated into place by Viber electric flexible-shaft units.

By following the above procedure, the invert forms were filled until practically level full. A steel slip-form, riding on a steel channel set on the edges of the longitudinal wooden forms, was then pulled forward by a cable attached to an air winch mounted on the front of the Pumpcrete machine, to give the proper contour to the invert. Vibration was accomplished by means of the flexible-shaft "wiggle-tail" vibrators directly ahead of the slip-form as it was moved forward. Immediately after the slip-form had passed over the fresh concrete, 1¼-inch Richmond screw anchors were set at 5-foot intervals for future use in holding the steel arch and side-wall forms in place. The invert surface was then wood-floated to remove irregularities, followed by further removal of irregularities and final shaping by Fresno-type long-handled finishing blades. Three to four hours later, depending upon the tunnel atmosphere, a final light steel troweling was given the surface, completing the work on the invert except for the application of curing compound and removal of forms.

Daraseal clear curing compound was applied in a single coat to the invert surface by means of a Littleford Style V Series 93-AH air spray unit. One gallon of the compound was used to cover 180 square feet of the invert surface.

Generally the forms remained in place 36 to 48 hours after concrete had been poured.

The invert operation on the west end of the work was similar to that on the east end except that a 580-foot "slick" Pumpcrete delivery line was suspended from the top of the tunnel by rollers hung from the steel tunnel supports or from anchor bolts set in holes drilled into the rock. With the line suspended from the roof of the tunnel, a drop of some 10 feet to the tunnel floor would have occurred. Consequently a movable chute was employed, which rode on the 6-inch paving forms and supported the discharge end of the Pumpcrete line. The entire line, chute, and "string" of equipment moved backwards as placement progressed.

Invert concrete normally had an average slump of 1¾ inches and was delivered by the Pumpcrete machines without difficulty.

Side-Wall and Arch Operation

Insofar as the handling of concrete materials, their mixing, and the handling of fresh concrete and its pumping are concerned, pouring of the side-wall and arch lining is similar to that involved in invert placement. The Pumpcrete delivery line in the side-wall and arch work is approximately 150 feet in length and consists of 130 feet of "flattened-slick" which passes over the top of the arch forms. The "flattened-slick" is standard 7-inch spiral-welded Pumpcrete pipe flattened to 6 inches in the vertical direction to provide more clearance between the crown of the tunnel and the form.

In beginning placement of the side wall and arch, the "slick" is placed with the discharge end 18 to 24 inches from the formed vertical construction joint of the previous day's work. One cubic yard of sand-cement mortar is first pumped into the forms, and distributed evenly into each side wall. The mortar is followed by concrete having a slump of 4½ inches until the area adjacent to the previously placed and hardened lining has been filled. The slump is then reduced to 4 inches and pumping continues until the concrete has covered the arch of the form and the discharge end of the "slick" is buried 5 to 10 feet. The "slick" and string of equipment are then moved 2 to 3 feet backwards and pumping continued. A 1-inch air valve located 20 feet from the discharge end of the "slick" is employed in slugging concrete into cavities in the arch and hips of the tunnel and also to prevent air pockets in areas where lagging or cribbing has had to be employed in support of the tunnel ground. However, little "air-slugging" is needed due to the pressure developed by the pump with the discharge buried 5 to 10 feet in the concrete.

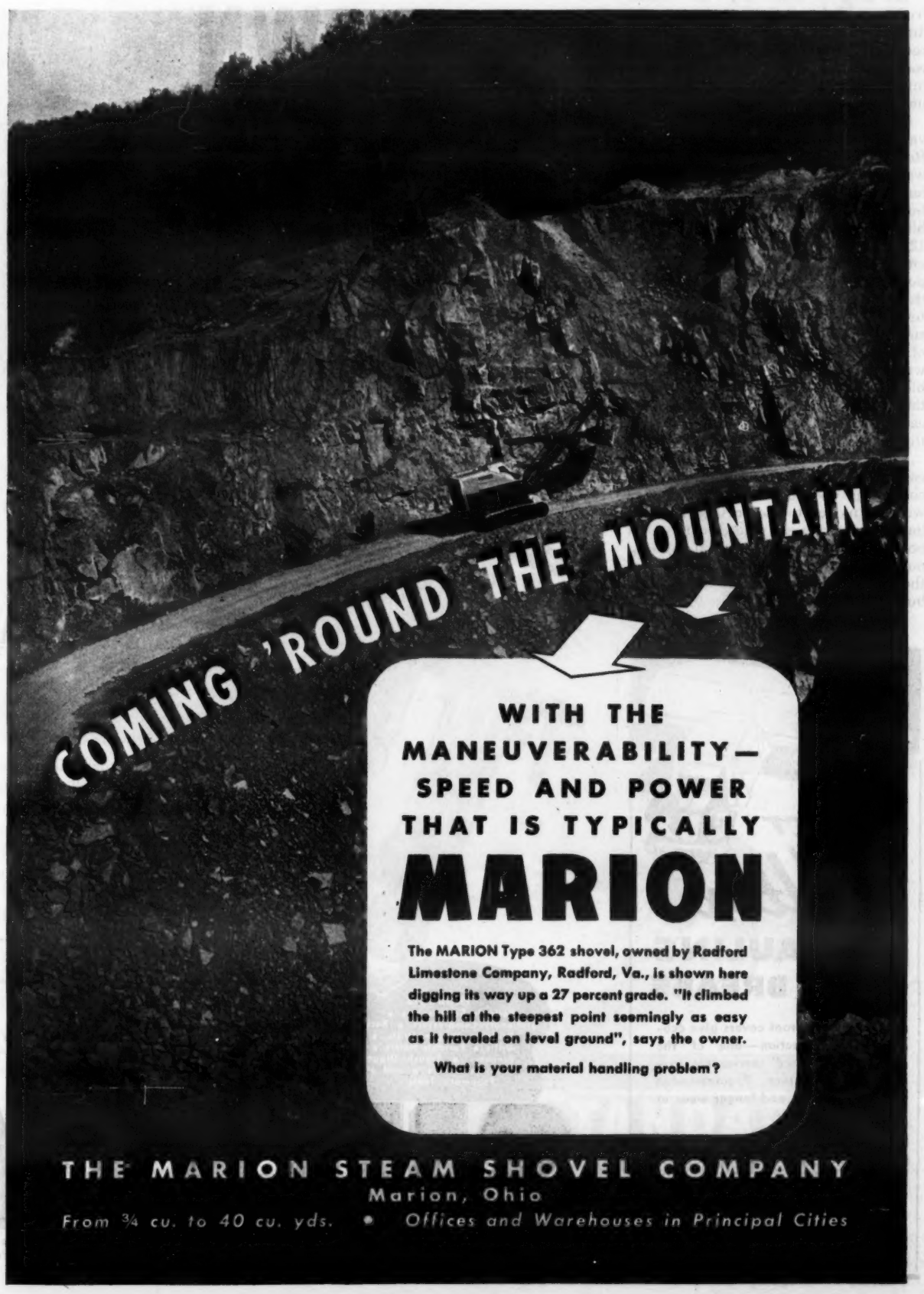
Concrete in the arch and side walls assumes a slope of 4 or 5 to 1 from the crown of the tunnel to the previously placed invert lining. The slope method of placement is permitted by specifications during the filling of forms, but at the end of a day's work it is required that a vertical construction joint be formed. This is accomplished by installing a wooden bulkhead at the end of the last 25-foot form section to be filled. Should operations be interrupted during placement and a cold sloping joint result, it is further required that the joint be prepared so that all surfaces are radial. This is done to avoid wedge-shaped spalls which might result from feather-edged joints.

Trucks for the transportation of the cement used in concreting operations in the Alva B. Adams Tunnel are equipped with specially designed watertight covers.

The concrete behind the arch and side-wall forms is consolidated by the use of internal and external vibration. The portion adjacent to and above the in-place invert is consolidated by internal vibration, employing Viber electric "wiggle-tail" vibrators. Hatches in the side wall provide access to this portion of the work. As placement progresses and hatches are closed, concrete can be consolidated only by external vibration which is accomplished by means of electric vibrators clamped to form members or by pneumatic chipping hammers applied to the ¼-inch skin plate of the forms. The completed lining is very smooth and so far free from rock pockets. Weep holes drilled show the concrete to be dense and homogeneous.

Patching, which has been of a minor nature to date, and dry-pack filling of the anchor-bolt holes in the invert complete the lining operation, except for the application of the Daraseal clear curing compound to the surface of the concrete after the forms have been re-

(*Continued on next page*)


COMING 'ROUND THE MOUNTAIN
WITH THE MANEUVERABILITY— SPEED AND POWER THAT IS TYPICALLY
MARION
The MARION Type 362 shovel, owned by Radford Limestone Company, Radford, Va., is shown here digging its way up a 27 percent grade. "It climbed the hill at the steepest point seemingly as easy as it traveled on level ground", says the owner.
What is your material handling problem?
THE MARION STEAM SHOVEL COMPANY
Marion, Ohio
From ¾ cu. to 40 cu. yds. • Offices and Warehouses in Principal Cities

A 13-Mile Tunnel

(*Continued from preceding page*)

moved, usually in 40 to 48 hours.

Placement progress in the lining of the arch and side wall is dependent upon transportation of materials into the tunnel, mixing of the concrete, and delivery of mixed concrete to the forms. As the distance between the site of the work in the tunnel and the tunnel portal becomes less, mixing and concrete delivery to the forms will be the controlling factors. Mixing which originally continued for a period of 1½ minutes has now been reduced to 1 minute. This reduction is made possible because of the re-mixing the concrete receives in the Pumpcrete machine. The average yardage of concrete now being delivered to the forms by the Pumpcrete machines is between 24 and 30 cubic yards per hour.

Drainage and Ventilation

The flow of water into the tunnel from courses or fissures intersected during excavation has been materially reduced by grouting the surrounding rock at high pressure. However, some inflow must still be cared for during the lining operation.

While the tunnel was being excavated, it was ventilated by means of Roots-Connersville blowers, and air was either blown to or drawn from the heading through 20-inch metal fan lines hung from the right tunnel arch. Two blowers, each having a capacity of 12,000 cubic feet of air per minute, were employed on the west side, one at the portal and another, 20,700 feet in from the portal, which functioned as a booster. On the east side, four similar but smaller blowers, each having a capacity of 7,000 cubic feet of air per minute, were employed. One of the smaller blowers was located at the portal and the others, serving as boosters, were located at 9,000 to 12,000-foot intervals throughout the tunnel.

Limited working space made it necessary to remove the fan line during concreting operations and the blowers were all moved to the portals. The two larger blowers were placed at the west portal and the smaller ones at the east portal. Bulkheads were constructed at the portals and access doors through the bulkheads were provided for the move-

On the east end of the Alva B. Adams Tunnel, concrete for the invert was deposited in the forms by a Pumpcrete, shoveled into place, and vibrated by Viber electric flexible-shaft units.

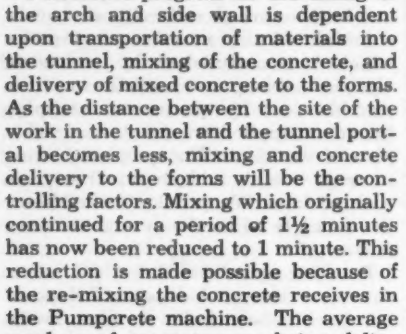
ment of equipment and materials. In normal operation, air is blown into the tunnel through the bulkhead structure from the east portal and drawn from the west portal for a week and the procedure is then reversed, blowing from the west portal and drawing from the east portal during the next week.

Status of Work

It is estimated that approximately 130,000 cubic yards of concrete will be required in the lining work. The invert lining required 0.24 cubic yard of concrete per linear foot, and the arch and side-wall lining, to date, 1.67 cubic yards of concrete per linear foot.

As of December 1, 1945, the S. S. Magoffin Co. had completed the invert on the east portion of the tunnel, and 18,632 feet or 54.0 per cent of the arch and side-wall lining. The Stiers Bros. Construction Co. completed the placement of all invert lining on the west half of the tunnel on August 15 and, as of December 1, had placed 32.2 per cent or 11,078 feet of arch and side-wall lining. It is anticipated that the lining can

(*Concluded on next page*)



PROTECT WITH Fultex TARPAULINS WIND BREAKS

Fultext waterproof covers give economical protection—one of the most widely used, serviceable covers on the market. Recommended for heavy duty and longer wear at low cost.

Quick delivery from stock on standard size covers.

FULTON BAG & COTTON MILLS

Manufacturers since 1870

Atlanta, St. Louis, Dallas, Minneapolis
New York, New Orleans, Kansas City, Kas.

If it's rock-bottom drilling costs you want there's a Sullivan profit-maker for every job. From the small versatile L-1 to the husky, hard-hitting L-57, every Sullivan drill is packed with power but cushioned on air.

Both the 45-pound L-47 and the 55-pound L-57 drills are equipped with the exclusive Sullivan thrifty dual-valve that "makes air do more work." The dual-valve positively controls the volume of air for highest efficiency and gives a *controlled cushion ahead of the stroke.*

Wherever low-cost footage is important — contractors, municipalities, public utilities and counties turn to the complete line of Sullivan hand-held drills. Ask your nearest Sullivan distributor or branch office for details on hand-held drills and the other Sullivan products that can help you get your construction costs down to rock bottom.

PRODUCTS
Portable Compressors • Stationary Compressors • Rock Drills • Wagon Drills • Core Drills • Portable Hoists • Paving Breakers • Trench Diggers • Sheeting Drivers • and other Pneumatic Tools

Sullivan Machinery Company, Michigan City, Indiana. In Canada: Canadian Sullivan Machinery Company, Ltd., Dundas, Ontario.

SULLIVAN

OFFICES { Birmingham • Boston • Butte • Chicago • Claremont • Dallas • Denver • Duluth • El Paso
Huntington • Knoxville • Los Angeles • Middlesboro • New York • Philadelphia • Pittsburgh
Portland • Salt Lake City • San Francisco • Seattle • Spokane • St. Louis • Washington, D. C.

On the western section, the contractor suspended the Pumpcrete delivery line from the top of the tunnel by rollers hung from the steel tunnel supports or, as shown here, from anchor bolts set in the rock.

A 13-Mile Tunnel

(*Continued from preceding page*)

be completed by the spring of 1946. The placement of arch and side wall so far has been only on a one-shift basis, six days per week, because of the manpower shortage. However, it is expected additional men can now be made available for two or possibly three-shift operation.

Supervision

All features of the Colorado-Big Thompson Project are designed and constructed under the supervision of the Bureau of Reclamation with main offices in Denver, Colo. Walker R. Young is Chief Engineer. Field supervision of project construction work is the responsibility of C. H. Howell, Project Engineer. Rex. P. Blackwell, Engineer, is responsible for concrete-lining work on the west end of the tunnel, reporting to Engineer G. R. Highley, who supervises all tunnel work on the west side. The writer is responsible for the lining of the east portion of the tunnel and for coordination of the work on both ends. The general supervision of all tunnel work on the east end is the duty of Engineer F. K. Matejka.

Frank R. Purvis is General Superintendent for the S. S. Magoffin Co. in the lining of the east portion of the tunnel, with George England, Concrete Superintendent. John Austin is General Manager for the Stiers Bros. Construction Co. in the lining of the west portion, with Ray Blasongame, Concrete Superintendent.

Ecuador Seeks U. S. Firms For Highways, Dredging

An Executive Committee has been established by Ecuador for the construction of transportation facilities in the province of Guayas, according to reports from South America. The body is authorized to construct highways and roads and to make waterway improvements which it considers necessary to facilitate traffic in the province. Its work will supplement the program of the Ministry of Public Works.

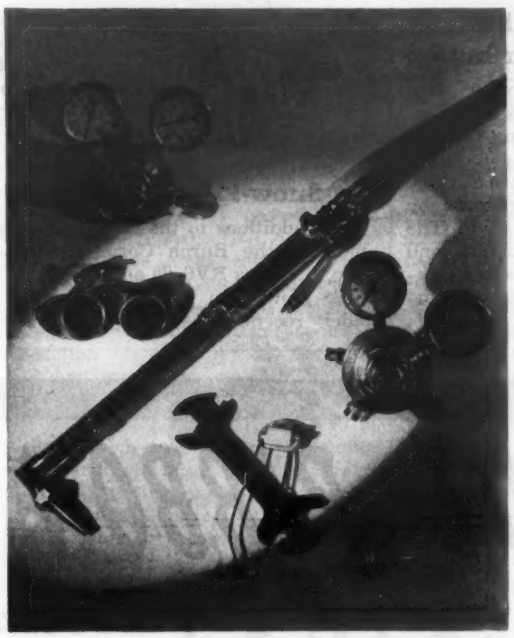
The initial project on the Committee's schedule is a highway from Guayaquil to Balzar, to cost about $3,600,000. It will follow the Duale River valley, and open up a section of the province heretofore not served by highway. Balzar will later be connected with Quevedo by another road.

To reduce the time and expense incidental to moving merchandise from the port of Puna to Guayaquil, and to permit vessels to dispatch their cargoes at the latter city, the Committee plans to dredge the Guayas River between those two cities. This work will cost about $1,500,000, and will be carried on simultaneously with the Duale valley highway project.

The Committee is authorized to supervise the financing of these projects, for which revenue from taxes on gasoline and petroleum products are available under the 1946 budget. It desires to contract for the initial projects with construction firms in the United States which would be in a position to finance the construction, with payment and interest on the funds advanced to come from the collections and tolls.

Furnival-Rimmer Renamed; Opens Harrisburg Office

As a result of an amendment to its charter, the Philadelphia equipment distributor organization of Furnival-Rimmer has changed its name to the Furnival Machinery Co. The firm, which serves as an outlet for LeTourneau, Chain Belt, Ingersoll-Rand, and Bucyrus-Erie, has offices at Lancaster Ave. and 54th St., Philadelphia. It recently established a branch, with Allen C. Fetterolf as Manager, at North Cameron and Forster Sts., Harrisburg.



This One Will Stay On the Job Longer

Often a good cutting torch prevents a costly shut-down of operations.

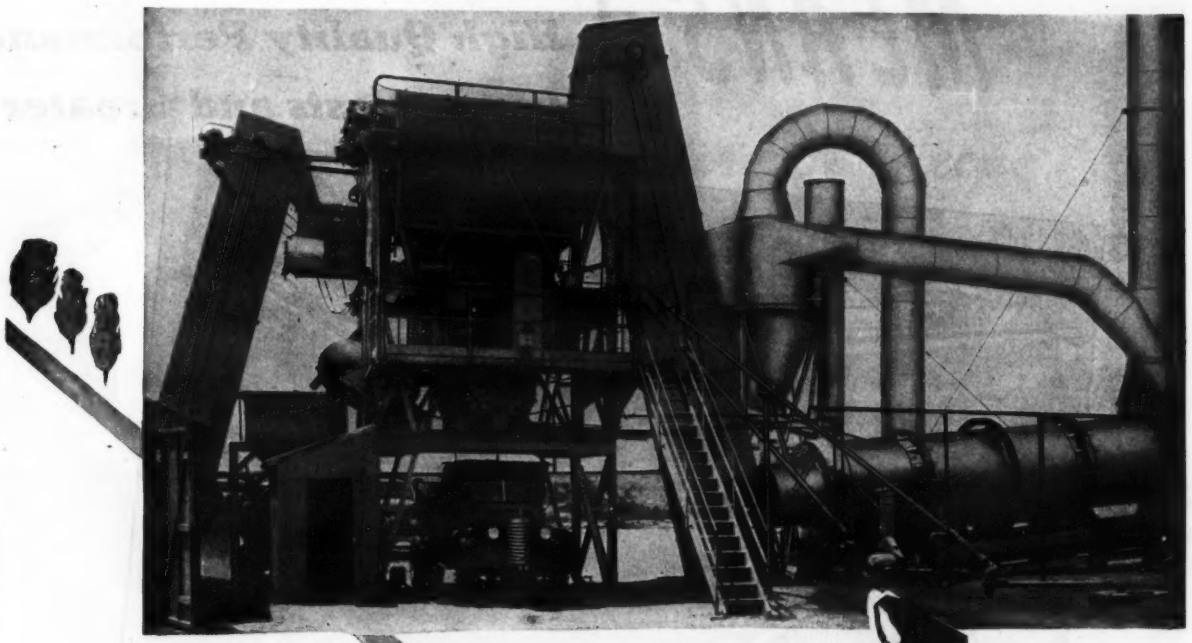
You cannot purchase a more dependable cutting torch—or one of wider range—than Victor.

Victor Equipment Company

844 FOLSOM STREET
SAN FRANCISCO 7

VICTOR

Ad 104



Ready for the Nations Highways

TOUGH WAR EXPERIENCE CONDITIONS EQUIPMENT FOR THE PEACE

Before the war, Standard Steel's Paving Plants made outstanding production records throughout the country in bituminous road construction. With war, this equipment has played and is playing an important role in the building of many, many airports, both at home and abroad. Performance under the toughest kind of operating conditions has proved the efficiency of this equipment. Not satisfied, however, Standard Steel engineers have plans, already past the drawing board stage, for increasing even more the effectiveness of these great paving plants. It will behoove contractors to keep an eye out for Standard Steel's post-war line of road machinery.

OTHER STANDARD ROAD CONSTRUCTION EQUIPMENT: ROLLERS, SUBGRADERS, BATCHING PLANTS, DRYERS, FINISHERS, BROOMS

STANDARD STEEL CORPORATION

General Offices and Plant: 5001 South Boyle Avenue
Los Angeles 11, California

New Welding-Rod Chart Ready for Distribution

To aid in choosing the proper electrode for a particular job's requirements, a wall chart describing the five types of Tournaweld welding rods has been made available to readers of CONTRACTORS AND ENGINEERS MONTHLY by R. G. LeTourneau, Inc., Peoria, Ill. The chart describes the specifications and applications of Tournaweld special repair and maintenance electrodes, including RW for track rollers, rails, etc.; HF for hard-facing blades, end tips, and Rooter points; and 78, a high tensile electrode; as well as the mild-steel all-position 77 and the 88 rods. Mention this notice when requesting the chart, Form WT-111.

Snow-Plow Bulletins

New additions to the snow-plow line made by the Burch Corp., Crestline, Ohio, the Ross RV6-80 and the RV6-87 truck plows are described in a new folder recently issued by that firm. Bulletins are also available on the RV-D6 V-type plow, for use with Caterpillar D6 tractors.

The RV6-80 and the RV6-87 are both heavy-duty V-type plows built for use with trucks having high propulsive power. RV6-80 has an 8-foot road clearance, and RV6-87, a clearance of 8 feet 7 inches. The RV-D6 clears a path 9 feet 3 inches wide. All three plows are equipped with Ross Sno-Flo moldboards, and have hydraulic operation throughout.

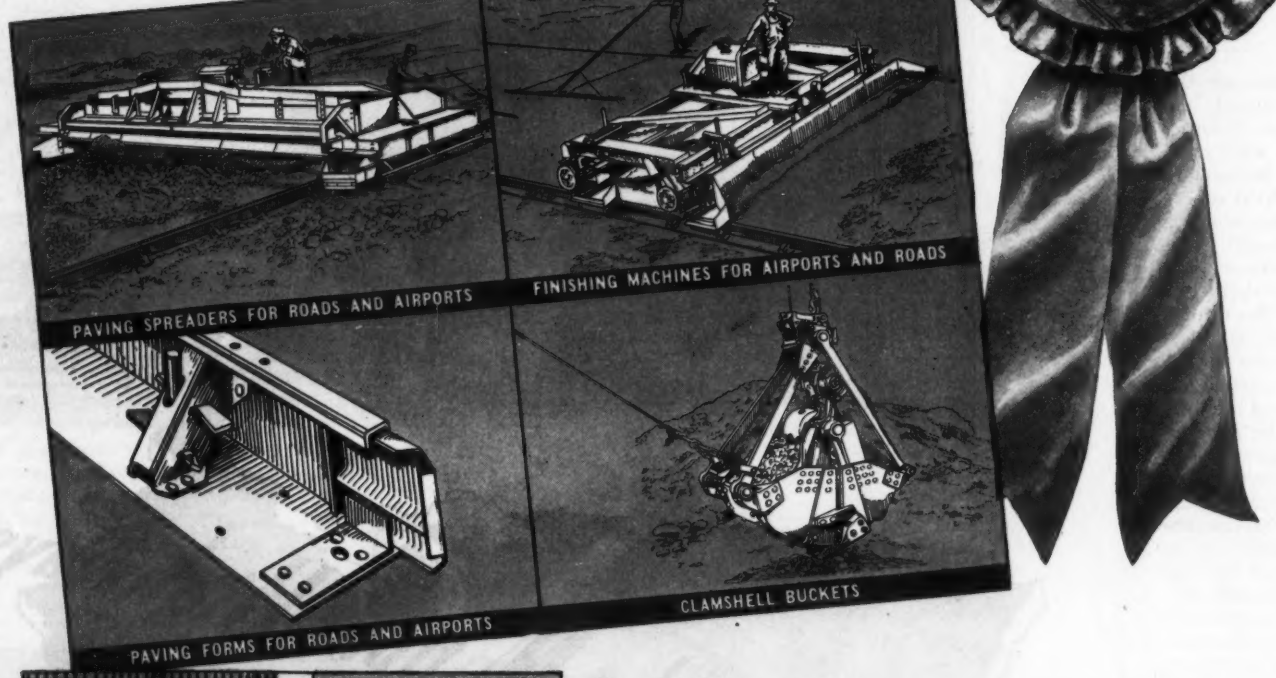
Full details and copies of the bulletins, with all specifications, may be secured direct from the manufacturer on mention of this report.

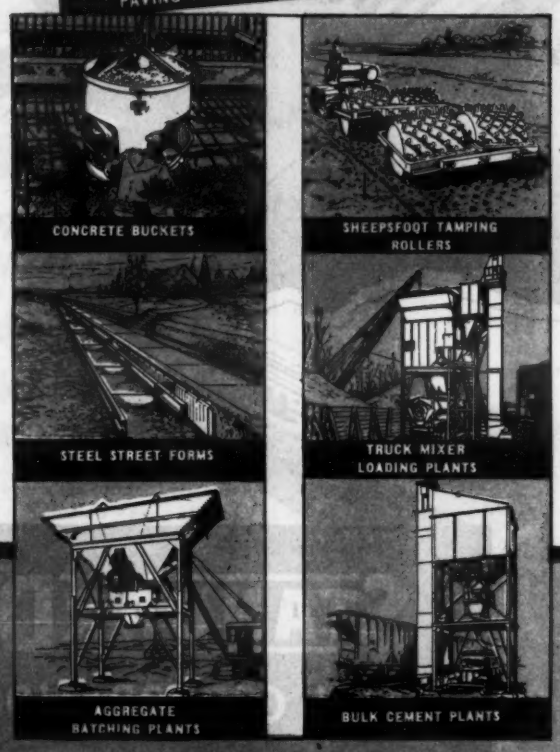
Link-Belt Texas Changes

Joseph W. Sears, district sales engineer for the Link-Belt Co.'s plant at Dallas, Texas, has been appointed District Sales Manager, with headquarters in Houston. He has been succeeded at Dallas by Stuart Penick, who has been with the engineering department of the firm's Chicago plant since 1942.

BLUE RIBBON PERFORMANCE

MEANS { Record Smashing Production
High Quality Performance
Lower Costs and Greater Earnings


PAVING SPREADERS FOR ROADS AND AIRPORTS
FINISHING MACHINES FOR AIRPORTS AND ROADS
PAVING FORMS FOR ROADS AND AIRPORTS
CLAMSHELL BUCKETS



Blaw-Knox Construction Equipment offers all three!

Where high speed construction is imperative, either to meet a tough schedule or to make up for unforeseen delays, you can bank on Blaw-Knox Equipment getting the job done quicker.

Where quality of work has to satisfy the requirements of rigid inspection, the Blaw-Knox equipped contractor can depend on his machinery.

Earlier completion and high quality performance through the use of Blaw-Knox Construction Equipment mean cost reduction and larger profits.

The features you are looking for — the factors that mean **Blue Ribbon Performance** — are built into Blaw-Knox batchers and forms, buckets, spreaders and finishers, etc. Experience of our armed forces overseas, and of contractors everywhere, bears this out.

For details — photos — performance data, write for Bulletin No. 2036.

BLAW-KNOX DIVISION of Blaw-Knox Co.
2067 Farmers Bank Bldg. Pittsburgh 22, Pa.

BLAW-KNOX
CONSTRUCTION EQUIPMENT

Design and Machines Aid Winter Traffic

Careful Design of Highways With Rounded Slopes Solves Many Problems, But It Is a Tough Fight in Mountains

By FRANK B. SARLES

✦ IN a state so sparsely settled that its population is only one person per square mile and its automobile registration is less than 45,000 vehicles, problems of snow removal and ice control, as well as of maintenance, are vastly different from those met in densely populated areas. Such conditions prevail in Nevada, where problems are increased by the fact that U. S. 40, a heavily traveled transcontinental route to California and the coast, extends for 417 miles within the state. This highway is kept open throughout the year, and although it is a small percentage of the 2,300 miles of roads on which the Nevada Department of Highways expends $100,000 annually for snow removal and ice control, the amount and importance of the traffic carried, the considerable snowfall occurring, and the extremely low temperatures encountered make this highway the most critical of any in the state.

Assistant State Highway Engineer H. D. Mills feels that the most effective weapon in the battle against snow is proper highway design. No use of equipment and man-power, no matter how extensive, can prevent some hindrance to the movement of traffic; but highways built with 6 to 1 rounded cut slopes, having embankments raised to a grade slightly above the level of the surrounding country and side slopes of at least 4 to 1 and preferably 6 to 1, remain self-cleaning and save much work for the forces engaged in the battle against snow and ice.

Organization

This battle against snow is conducted by the same organization responsible for routine maintenance. The state is divided into six divisions, with Division Engineers in charge at Las Vegas, Reno, Elko, East Ely, and Tonopah. Each Division Engineer is assisted by a Division Maintenance Superintendent and under him work a number of district foremen, each responsible for the operations of three or four section crews, the operating units. These section crews consist of a foreman and from one to four men, employed on a monthly salary. Each section crew is responsible for snow removal, as well as routine maintenance, on from 20 to 40 miles of road and works out of a section headquarters which consists of at least a heated and insulated building large enough to provide storage for three units of mobile equipment, with additional outside storage, and which may include nicely built houses for the use of the section-crew members and their families.

Facilities for repairs at these section headquarters are limited, with little expenditure for tools or machines. Heavy repairs are made in the division shops, and major overhaul jobs are taken either to the fully equipped central shop in Reno or to the division shops at Las Vegas or Elko.

Snow-Plowing Equipment

Motive power for the snow plows ranges from 1½-ton Ford and Chevrolet trucks, through 2 and 3-ton Dodge and GMC trucks, to 5 to 7-ton Walters and FWD's. All except the lightest units are equipped so that not only can the one-way snow blades be reversed to plow in either lateral direction, but V-plows can be substituted for the one-way blades. Each section crew has one light truck and either a medium or heavy, depending on the anticipated demand as shown by previous experience, with interchangeable V-plows and reversible one-way blades for each. In some of the more critical sections a third unit may be stationed there throughout the winter. The rather high-speed snow plowing practiced in Nevada makes the use of rolled blades advantageous. The Department does not design its own plows, but purchases most commercial makes on a competitive basis, with Frink, Baker, and Austin-Western plows used extensively.

Six Snogos, usually stored at Reno, Carson City, Winnemucca, Elko, and Ely, are available for immediate transfer and use in any section where their services are required.

Operating Procedure

By comparison, snowfall in Nevada is not excessive, since the usual storm seldom exceeds a foot in depth though it may last from one to three days and be accompanied by both high winds and temperatures as low as 40 degrees below zero, with both the wind and the low temperature continuing for weeks after the snowfall has ceased. The central office reports that the more critical areas are in the western part of the state, with the major portion of the $100,000 annual expenditure for snow plowing and ice control being spent in that section.

But during an interview with Division Engineer W. R. Parry at East Ely, he reported one pass near Eureka, well to the east, which required snow plowing from November 11 to May 17 last year, and it is such unusual conditions as this which cause the winter expenditure to vary so widely, reaching $175,000 in 1936. This particular summit has points of similarity with many of the troublesome mountain passes of the western United States. Mr. Parry reported that the snowfall there is not excessive, seldom reaching a total depth of more than 3 feet on the level and remaining at 6 inches for much of a normal winter, but that the peculiar and continuous winds make it a major undertaking to keep the road open to traffic. For ¼ to ½ mile from the pass the air may remain calm and peaceful, but at that particular summit, where relocation is impractical because of the topography, wind currents blow the snow back onto the road, often mixed with sand and silt, to form drifts which require the maximum power of a heavy V-plow and often even the use of the Snogo to restore the road to traffic.

Usual procedure is to start plowing, day or night, with the first snowfall. The light plows go into action first, moving in the direction of traffic at a speed of from 30 to 35 miles per hour, and plowing the road surface from shoulder to shoulder. When possible, the shoulders are also cleared by throw-

(Continued on next page)

A COMPANY IS KNOWN BY
the Distributors It Keeps . . .

Here at Novo, we are mighty proud of our distributors; and for a number of very good reasons. One reason, of course, is their standing in their communities. They are progressive . . wide-awake . . respected and trusted in their counsel on customer problems.

But we're equally proud that their success reflects so truly the quality of Novo equipment. That they—and their customers in turn—are enthusiastic about the trouble-free performance of Novo products is proved by their length of association with Novo—eleven have been with us from 20 to 27 years; fifteen from 10 to 20 years; and nineteen from 5 to 10 years.

Yes, a company is known by the distributors it KEEPS; and just as surely, distributors are known by the company they represent, for the integrity of the product they sell enhances their success. We are justly proud of our mutual efforts.

W. H. ANDERSON COMPANY, INC. Detroit, Michigan
CLYDE W. BECKNER, INC. Charleston, West Virginia
FRED BERRYHILL EQUIPMENT CO. Lubbock, Texas
BLAKE EQUIPMENT COMPANY Columbus, Ohio
BLUEFIELD SUPPLY COMPANY Bluefield, West Virginia
THE BOARDMAN COMPANY Oklahoma City, Oklahoma
BOCK EQUIPMENT COMPANY Indianapolis, Indiana
BORCHERT-INGERSOLL, INC. St. Paul—Duluth, Minnesota
BRINKER SUPPLY COMPANY Pittsburgh, Pennsylvania
BURAN EQUIPMENT COMPANY Oakland—Eureka, California
DON A. CARPENTER & COMPANY El Paso, Texas
COLUMBIA EQUIPMENT COMPANY Portland, Oregon; Seattle—Spokane, Washington
CONTRACTORS SERVICE, INC. Charlotte, N. C.
CREDLE EQUIPMENT COMPANY Utica, New York
DEMPSTER BROTHERS Knoxville—Nashville, Tennessee
MATT A. DOETSCH MACHINERY CO. Washington, D.C.
EASTERN EQUIPMENT, LTD. Fredericton, New Brunswick, Can.
EASTERN TRACTOR AND EQUIPMENT COMPANY Portland, Maine
EDMUND SUPPLY COMPANY Toledo, Ohio
E. K. S. EQUIPMENT COMPANY Grand Rapids, Michigan
EPPERSON & COMPANY Tampa, Florida
EQUITABLE EQUIPMENT COMPANY New Orleans, Louisiana
B. C. EQUIPMENT COMPANY, LTD. Vancouver, B.C.
FARQUHAR MACHINERY COMPANY Jacksonville, Florida
FEHRS TRACTOR & EQUIPMENT CO. Omaha, Nebraska
FERGUSON SUPPLY COMPANY, LTD. Calgary, Alberta, Canada
THE FINN EQUIPMENT COMPANY Cincinnati, Ohio
JOHN B. FOLEY, JR. Syracuse, New York
FROST MACHINERY COMPANY, LTD. Winnipeg, Manitoba, Canada
FUNKHOUSER MACHINERY CO. Kansas City 8, Missouri
GARLINGHOUSE BROTHERS Los Angeles, California
GENERAL EQUIPMENT & SUPPLY CO. Miami, Florida
GILL EQUIPMENT COMPANY Atlanta, Georgia
GLOBE MACHINERY & SUPPLY CO. De Moines, Iowa
HAVERSTICK & COMPANY, INC. Rochester, New York
HENDRIE & BOLTHOFF Denver, Colorado
INDUSTRIAL MACHINERY CO., INC. Halifax, Nova Scotia
INDUSTRIAL SUPPLY COMPANY Richmond, Virginia
THE LANG COMPANY Salt Lake City, Utah
LITTLE ROCKROAD MACHINERY CO. Little Rock, Arkansas
MARYLAND SUPPLY & EQUIPMENT COMPANY Baltimore, Maryland
METALWELD, INC. Philadelphia, Pennsylvania
MINE & SMELTER EQUIPMENT CO. Phoenix, Arizona
MISSOURI-ILLINOIS TRACTOR & EQUIPMENT COMPANY St. Louis, Missouri
MONTANA HARDWARE COMPANY Butte—Great Falls, Montana
MUSSENS CANADA LIMITED Montreal, Quebec; Toronto, Ontario
MYHRA EQUIPMENT COMPANY Fargo, North Dakota
NATIONAL EQUIPMENT COMPANY 510-512 South Clay Street Louisville, Kentucky
NEVADA TRUCK SALES Reno, Nevada
NORTHWEST SUPPLY & EQUIPMENT COMPANY Marietta, Ohio
H. O. PENN MACHINERY COMPANY New York City—Poughkeepsie, N.Y. Mineola, L.I.
PERRIN, SEAMANS & CO., INC. Boston, Massachusetts
HENRY A. PETTER SUPPLY CO. Paducah, Kentucky
SAN ANTONIO MACHINE & SUPPLY CO. San Antonio—Waco—Corpus Christi—Harlingen, Texas
SERVIS EQUIPMENT COMPANY Dallas, Texas
SMITH TRACTOR & EQUIPMENT CO. Irvington, New Jersey
SOUTH TEXAS EQUIPMENT CO. Houston 1, Texas
STONE MANUFACTURING COMPANY Milwaukee, Wisconsin
STRAITS ENGINEERING COMPANY Sault Ste. Marie, Michigan
Service and Supply Division LAKE SHORE ENGINEERING COMPANY Iron Mountain, Michigan
M. F. TAYLOR COMPANY Stamford, Connecticut
ROY C. THOMPSON COMPANY Presque Isle, Maine
TIDEWATER SUPPLY COMPANY, INC. Columbia, South Carolina; Norfolk, Virginia; Roanoke, Virginia
VAN NOUHUYS PUMP & SUPPLY CO Albany, New York
WATKINS-ALDRIDGE EQUIPMENT COMPANY, LTD. Jackson, Mississippi
WESTERN EQUIPMENT & SUPPLY CO. Rock Island, Illinois
WHEELER EQUIPMENT COMPANY Buffalo, New York
YOUNG AND VANN SUPPLY CO. Birmingham, Alabama

. . . and DISTRIBUTORS ARE KNOWN BY
the Company They Keep

Allied Member of A.E.D.

NOVO ENGINE COMPANY LANSING 5, MICH. U.S.A.
CONTRACTOR'S EQUIPMENT
GRAY IRON CASTINGS
ENGINES

Design and Machines Aid Winter Traffic

(*Continued from preceding page*)

ing the snow into the ditches. The plows are usually run singly from end to end of the section and are kept in continuous operation for the duration of the storm. Crews from other locations are moved into the section where the battle with snow is in progress and the additional man-power so secured is used to relieve the regular forces. Hours of work are dictated by the availability of men for relief, though every attempt is made to limit snow-plowing duty to shifts of an 8-hour maximum.

When the snowfall becomes too heavy to be handled by the light equipment, the heavier plows are thrown into action, but it is more likely to be the snow previously removed and blown back into drifts, much more densely packed and harder to handle than were the original ones, which calls for the heavier plows. Temperature and moisture conditions also complicate the removal of these secondary drifts. According to Mr. Mills, a drift so formed and only 2 feet in depth may be "too tough for even the big plows, and will make the Snogos moan".

As in most western states, it is the first snows in the autumn which ordinarily give the most trouble. Not only are they likely to be wetter and more apt to pack solidly, but traffic is usually caught unprepared, and much time is lost by the plowing forces in aiding stranded motorists, frequently tourists totally unfamiliar with driving in snow. This lost time may result in a road becoming temporarily closed.

Ice Hazards

Because of the continued low temperatures following snows in much of Nevada, ice hazards are less serious than in some other states where alternate thawing and refreezing are encountered. Stockpiles of screened natural materials are maintained, however, at intervals of from 1 to 3 miles, the amount placed in each pile during the summer and fall being dictated by past experience.

A few of these piles may be treated with calcium chloride but the practice is not general in Nevada because the material is usually so dry when stockpiled that there is little danger of its freezing deeply, and the thin crust which may form over the surface of the pile is easily removed to permit loading the material into the dump trucks. These trucks are equipped with trailer spreaders, both the spinner type and Buckeye spreader boxes being used.

Weeds and Snow Fences

Since tall weeds left standing in the wrong places often act as unwanted

(*Concluded on next page, Col. 2*)

BRIGGS & STRATTON ENGINES

"PREFERRED POWER"

THE WORLD OVER

EACH year for over a quarter of a century Briggs & Stratton has been the largest producer of single cylinder, 4-cycle, air-cooled gasoline engines. This continued demand for more and more of these engines is a tribute to their dependable and economical operation — from users, dealers and producers of powered equipment the world over — and also an appreciated tribute to the men and women of Briggs & Stratton who build them. You can buy Briggs & Stratton powered equipment confident of receiving the utmost in engine performance.

BRIGGS & STRATTON CORPORATION
MILWAUKEE 1, WISCONSIN, U.S.A.

Air-Cooled Power

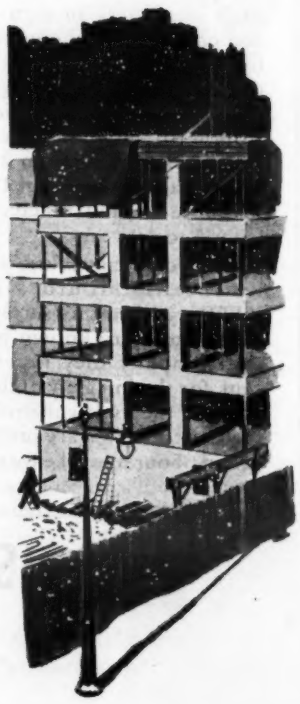
4 CYCLE BRIGGS & STRATTON GASOLINE ENGINES

BROWNHOIST BUCKETS

Designed and built by Industrial Brownhoist Corp. do a better job because, 1) Large Sheaves reduce rope wear, 2) Heavy Carbon - Steel digging lips take deep, clean bites, 3) Extra-sturdy construction insures long life. Write for complete facts to Industrial Brownhoist Corporation, Bay City, Michigan. Offices in New York, Philadelphia Cleveland and Chicago.

BROWNHOIST BUILDS BETTER BUCKETS

Stop WINTER LAG* IN CONCRETE



Winter Lag* is the progressively slower action of concrete in acquiring strength as the thermometer goes down.

Much of this Winter Lag* in concrete can be overcome by using calcium chloride in-the-mix. For instance, concrete containing 2% calcium chloride, exposed to 40° temperature, will acquire safe strength in practically the same time that plain concrete does at 70°. Used with other normal protection, concrete can be placed on favorable schedules all the year 'round. This is the least expensive as well as the most effective means of speeding up cold weather concrete schedules.

Besides the high early strength induced by calcium chloride you get built-in curing — automatic curing at no extra cost and you get higher strength *at all ages*.

Ask for our Bulletin 28, "Early Strength Concrete."

CALCIUM CHLORIDE ASSOCIATION
4145 Penobscot Building • Detroit 26, Michigan

CALCIUM CHLORIDE

SPEEDS WINTER CONCRETE CONSTRUCTION

The new Delbridge withholding-tax chart meets all the requirements of the 1946 income-tax law.

Simplified Payroll Withholding Chart

The revised income-tax law for 1946 requires that every employer use a new set of figures when computing the withholding-tax deductions on his payrolls. Because the highly condensed withholding-tax sheets issued by the government revenue offices do not meet the efficiency requirements of most payroll departments, a simplified withholding-tax chart has been published by Delbridge Calculating Systems, Inc.

Designed to insure accuracy as well as save time in making payroll deductions, the Delbridge chart meets all the requirements of the new tax law. It is published in four editions for weekly, bi-weekly, semi-monthly, and monthly payroll periods. Each edition also shows deductions for one to seven-day miscellaneous periods, eliminating the need for multiplication or division. The chart, printed in large easy-to-read type, is of the visible-index hinged-card-type system.

Full details on the Delbridge simplified withholding-tax chart may be obtained by writing to Delbridge Calculating Systems, Inc., 2502 Sutton Ave., St. Louis 17, Mo. Just mention this description.

Measure Production With an Hour Meter

What the speedometer and odometer are to the motor truck and automobile, the Hour Meter is to the stationary gasoline or diesel engine. It insures economical operation and long engine life by giving positive data on the efficiency based on actual operating conditions.

Hour Meters are specialized instruments designed for individual types of motors to record the hours of operation. They obtain this information through the conversion of an average crankshaft speed into hours of running time. The meter actually is a geared revolution counter driven through a series of reduction gears so that the normal speed of an engine operating 60 minutes registers one on the counter.

With the meter registering actual running hours of engines, servicing records can be based on definite elapsed time in use. From this, owners and operators can set up records to give a true picture of running costs, covering oil and gas consumption, maintenance, repairs, and replacements.

Durant Mfg. Co., 1976 No. Buffum St., Milwaukee 1, Wis., has two standardized types for either magneto or distributor-equipped engines with distributor mounting available for installation of the Hour Meter. Definite information must be given regarding the engine on which the Hour Meter will be used for the manufacturer to determine if standard units are suitable. Special models are engineered for various makes of gas and diesel engines on which standard models are not adaptable.

A new catalog section has just been issued by Durant and may be secured by writing direct to the manufacturer and mentioning this news item.

Design and Machines Aid Winter Traffic

(*Continued from preceding page*)

snow fences, it is a policy of the maintenance department to mow them late in the autumn before the first snowfall is expected. Partly because much of the state is open range where cattle graze along the right-of-way, there is little use of oil or chemicals for weed control, mowers being used entirely for the reduction of this hazard. In the irrigated sections of the state, the farmers owning land adjacent to the highways are particularly critical of this phase of highway maintenance, and voice their objections freely if mowing is neglected.

Although it is impossible, in the mountainous terrain of Nevada, to state that the wind always blows from one direction and that snow fences must be constructed always on a particular side of a road having a certain bearing, still the peculiarities of the mountain wind currents follow a certain pattern, and at any particular location the wind direction remains fairly constant and the location of the snow fence becomes a matter of observation and experience. The popular slat-type snow fence, supported by steel posts, is customarily used in Nevada. It is erected at least 100 feet from the top of the cut slopes and usually built 6 feet high, although two tiers with a total height of 12 feet are placed in some locations. It is not general practice to remove the fences in the summer since it is felt that weathering is less destructive than the stress of moving and re-erection. In some locations, temporary fences of wire and sage brush have been constructed, and have proved to be quite effective.

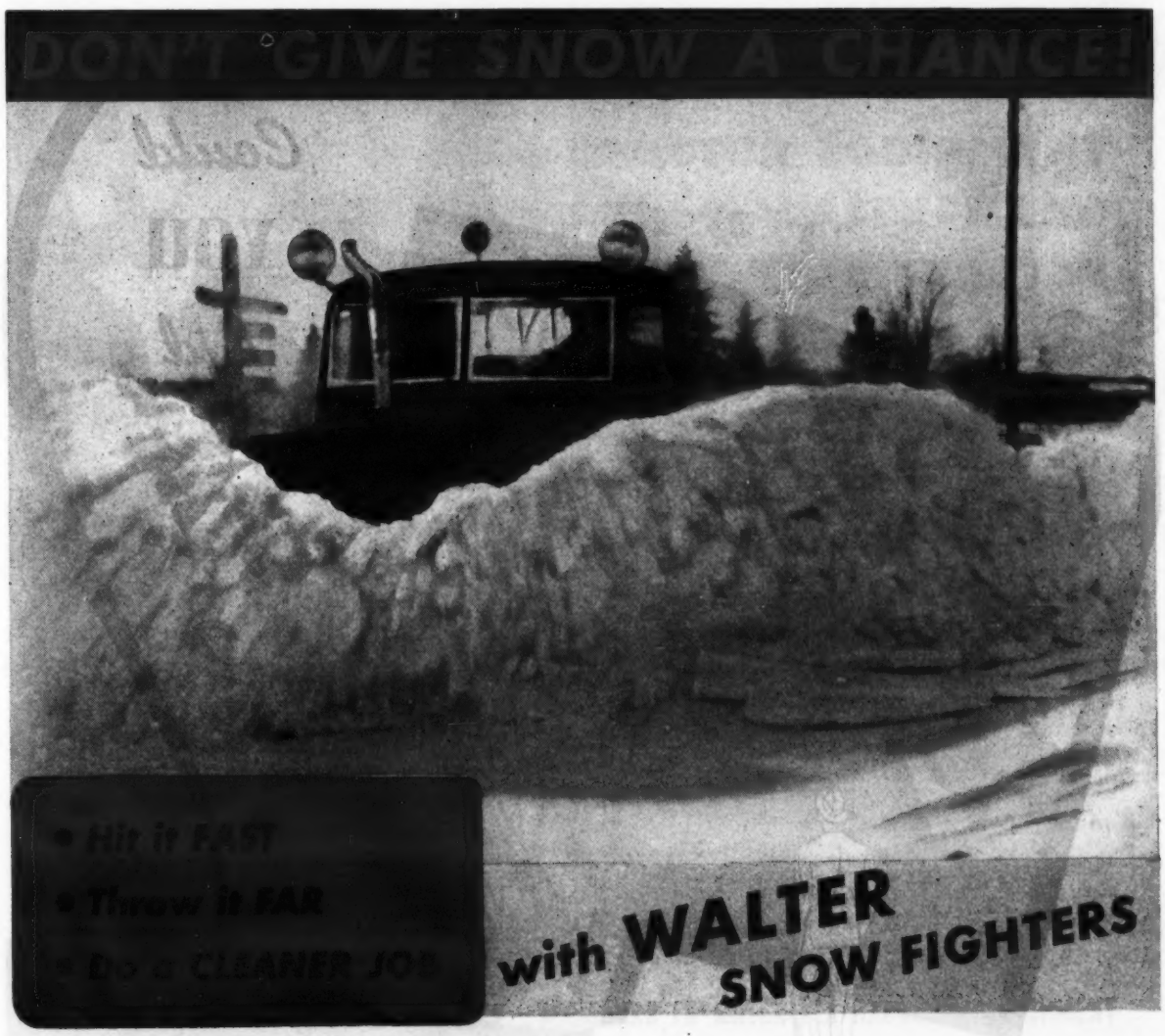
Personnel

Like other maintenance operations, snow plowing and ice control in Nevada are directed by the Division Engineers, J. M. Murphy at Las Vegas, J. L. Hancock at Reno, F. H. Depp at Elko, W. R. Parry at East Ely, and J. D. Meacham at Tonopah, with the general policy directed by C. E. Wood, State Maintenance Engineer, from the central office at Carson City.

Road-Repair Equipment Literature Now Ready

Three units "needed today to repair and construct our vital highway system" are featured in a folder available from Littleford Bros., manufacturer of black-top road-maintenance equipment. Copies may be secured by writing to the firm at 485 E. Pearl St., Cincinnati 2, Ohio.

The folder features the Littleford 84-HD bituminous kettle which has double-heat circulation and a screened reservoir. Photographs of the kettle, with various optional attachments, are included. The portable Trail-O-Roller, Model 155, is also shown, as is the Model 101 Utility spray tank, which provides a spray bar, a hand spray for patching, and a pouring-pot outlet in one unit.

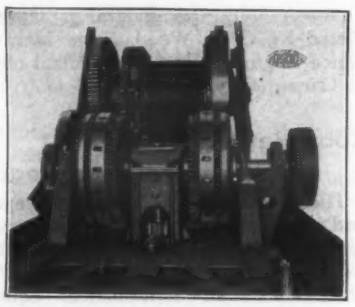


Once snow forms into hard banks, deep drifts and icy ruts, you're in trouble! Surest way to avoid these hazards is to keep *ahead* of the storm with Walter Snow Fighters. They clear 28 ft. lanes at speeds up to 30 m.p.h. This high speed clearing throws snow far off the road—leaves less snow to handle on subsequent runs—makes widening out, cleaning up and pavement scraping much easier.

Such sustained high speed clearance is possible *only* with Walter Snow Fighters because of the 100% traction provided by the Four Point Positive Drive. There is no wheel spinning, slipping or stalling on snow or icy surfaces. Steady tractive power is available at all times.

Walter Snow Fighters have greater clearing capacity, thus fewer units do a more effective job, cutting your equipment, maintenance and snow removal costs. Have one of our snow removal experts discuss your needs. Write for detailed literature today.

WALTER MOTOR TRUCK COMPANY
1001-19 Irving Avenue, Ridgewood 27, Queens, L. I., N. Y.



The Magnetorque electric clutch is a feature of the new P&H Model 1055 shovel.

Non-Friction Clutch Reduces Shovel Wear

In what is said to be the first successful application of an electric clutch to large friction shovels, the Magnetorque clutch has been installed on the post-war Model 1055 P&H shovel, the Harnischfeger Corp. has announced. Using electromagnetic forces, the new device transmits power for the swing and propel motions, eliminating the frictional connections between the shovel mechanism and the engine.

As it operates continuously while the shovel is in use, the swing mechanism is the machine's most worked part. Each reversal subjects the friction clutch to great lining wear and heat. Since the Magnetorque obviates this, it is claimed to eliminate the shovel's greatest source of wear. Until now the swing clutch, with its complicated linkages and adjustments for smoothly overcoming the inertia of the revolving structure, has been one of the big engineering problems on large friction shovels.

Built to last the life of the shovel, the Magnetorque is mounted on the jackshaft in much the same manner as the conventional swing clutch, and is driven by the 240-hp diesel engine. A small generator on the engine furnishes the excitation for power transmission. Swing and propel motions are effected by two small controls at the operator's station.

Full details on the Magnetorque may be secured by writing to the Harnischfeger Corp., 4419 W. National Ave., Milwaukee 14, Wis., and mentioning this news item.

G-E Motor Division Shifts

Reorganization of its Motor Division has been announced by the General Electric Co., Schenectady, N. Y., to make possible a natural arrangement of operating units. This division has now been separated into four divisions and one section, and W. H. Henry, Manager of the division, has been made Assistant Manager of the Industrial Divisions in charge of motor business.

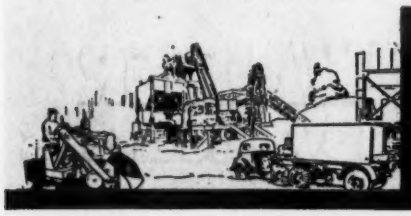
A. W. Bartling heads the new Fractional-Hp Motor Division; Elliott Harrington is Manager of the Induction Motor Division; J. T. Farrell, Manager of the DC Motor Division; and P. A. McTerney, Manager of the Synchronous, Large DC, and Gear-Motor Division. E. A. Green and D. E. Moorhead return to the motor organization as assistants to Mr. Henry.

Bulk Cement Plants the country over show the strain of war-time production. Even those that were new shortly before Pearl Harbor have had to meet grueling production schedules through a long period when maintenance and repair facilities were inadequate. And war-time technical improvements in economy of operation have brought new production, — and, therefore, — competitive standards to the field.

Is your Bulk Cement handling equipment adequate in repair and in up-to-date design to meet the rigorous production demands of present day construction? Contracts will be awarded this winter for spring work. Jobs will go to the man who is known to have the equipment. Demands for modern Bulk Cement Plants may easily create delivery uncertainties. Protect yourself. Buy now the equipment you need to bid successfully the jobs you want.

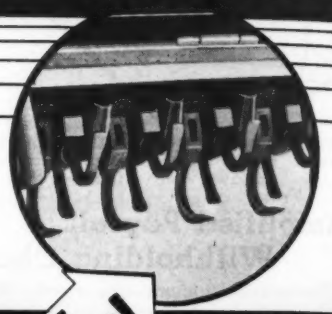
And let Butler Engineered Design put peak efficiency in your new Bulk Cement handling equipment.

Just off the press, — this illustrated Butler Bulletin will give you all the information you are looking for in modern Bulk Cement Plants. Write today for your copy of Bulletin 210-C.



BUTLER
BIN COMPANY
WAUKESHA, WISCONSIN

THE *Swirling* CHOPPING ACTION OF THESE TINES



DOES THE JOB! WHEREVER AGGREGATES ARE USED ON ROADS

ARIENS AGGMIXER

Ariens Aggmixer does a thorough job of pulverizing and mixing—wet or dry. It mixes and aerates the aggregates with the binder used, as it is equipment for use wherever aggregates are used, such as all types of bitumens, clays, cements, chlorides, etc., and mixes these materials without displacing them on the road surface.

It is equipment designed especially for mixed-in-place construction, operating in connection with other general purpose road equipment. It does the job thoroughly, rapidly and economically . . . it is safe and easy to operate . . . adjustable to any tractor . . . made in 4 sizes with normal cutting widths 4', 5', 6', and 7'.

Write for complete job facts and name of nearest distributor.

ARIENS Company
BRILLION, WISCONSIN

BACK THEM
BUY BONDS

Mark well this button. It is worn by the men and women honorably discharged from the armed services. Though they are now in civilian clothes, let's not forget their service to our country and to us. They still rate our every consideration.

Well Laid-Out Plant For Hot-Mix Contract

Continuous-Mixing Plant Served by Two Spur Tracks; Small Spreader Crew Lays 400 Tons in 12 Hours

By THEODORE REED KENDALL, Editor

✦ A CONTINUOUS-production hot-mix plant set up longitudinally between two spur tracks delivered a daily average of 400 tons of binder or top for resurfacing 8.2 miles of U. S. 33 between Louisa and Mineral, Va., last summer. The old 16-foot concrete road had been widened 4 feet on either side with concrete strips, and this maintenance contract called for 150 pounds of binder course per square yard and 130 pounds of top per square yard over the full width. The contract was awarded to the Atlantic Bitulithic Co. of Washington, D. C., on its bid of $97,994.20.

Plant Layout

The Barber-Greene continuous-mixing asphalt plant with twin driers was set up adjacent to a spur of the Chesapeake & Ohio Railroad near Mineral. Sufficient area was left between this spur and the plant to permit storing at least two full days' supply of the two sizes of stone and sand. The aggregate and sand were shipped in gondola cars from the Richmond Sand & Gravel Co. at Richmond, Va., with nine or ten cars being delivered and unloaded every day, including Sunday. Inasmuch as no hot-mix was produced or laid on Saturday or Sunday, the aggregates delivered on those days were unloaded to the stockpiles by the contractor's 1927 Link-Belt crane with a 1¼-yard Owen clamshell bucket. On the other five days, when the plant was operating, the crane unloaded direct to the feeding hopper of the plant until the cars were empty and then took from the stockpiles. The cars were shifted by a Caterpillar D7 tractor operated by the plant foreman.

The lower section of an old steel concrete-aggregate batching plant was used as the feeding hopper set up over a Barber-Greene reciprocating feeder which delivered a measured quantity of the mixed stone and sand to the cold elevator of the plant. At the top a divided chute delivered equal quantities of the mixed aggregate to the twin 4-foot-diameter 20-foot-long Barber-Greene driers. A Buda 75-hp gas engine set up alongside the driers drove the cold elevators, the feeder, the two driers, and the hot elevator. To insure adequate draft in the two driers to produce the volume of hot dry aggregate required, and to remove excess fines, the contractor replaced the tall metal stack with an elbow connected to a 6-foot-diameter suction fan driven by an International UD-14 diesel engine.

The dried material from the hot elevator was sized by vibrating screens, delivered to the plant bins, and then its flow metered by adjustable gates to the continuous pugmill. A second 75-hp Buda gas engine drove the Barber-Greene plant, with a separate 24-hp Wisconsin engine for the shaker screen.

The binder used on this job, meeting Virginia specification for Type H-2 bituminous pavement, conformed to the following, by weight:

Sieve Size	Per Cent Passing
¾-inch	100
⅜-inch	60-80
No. 4	42-62
No. 10	20-40
No. 100	2-8
Asphalt	5-8

For the top course, Virginia specification F-1, the proportions were as follows:

Sieve Size	Per Cent Passing
⅜-inch	100
No. 4	85-100
No. 10	65-95
No. 40	20-45
No. 80	5-30
No. 20	2-12
Asphalt	5½-9½

Asphalt and Fuel Oil

Asphalt, lime dust, and hydrated lime were delivered on a second spur track close by the plant but on the opposite side from the aggregate spur. The Bunker B fuel oil was delivered by tank trucks and transferred to the 8,000-gallon storage tank by the pumps on the trucks. A reciprocating steam pump picked up the fuel oil for delivery under pressure to the drier torches where it was atomized by steam from a 125-hp horizontal boiler hand-fired with soft coal.

Steam was also supplied to two connections for asphalt tank cars from which the heated material was taken by a Warren Bros. rotary steam-jacketed asphalt pump and delivered to the battery of three storage tanks with a com-

(*Concluded on next page*)

C. & E. M. Photo

Hot-mix from the Barber-Greene plant was delivered at truck-body height to trucks carrying 6 to 6½ tons per load an average 5-mile haul to the road being resurfaced.

HYSTER

Rugged

TRACTOR EQUIPMENT for your "CATERPILLAR" TRACK-TYPE TRACTOR

HYSTER tractor equipment is quality all the way through. Sound engineering. Rugged construction. Long life.

Hyster line is made for use with "Caterpillar" track-type tractors. Models include winches, donkeys, yarders, cranes, sulkies, logging arches.

Hyster Company has specialized in "Caterpillar" equipment for 16 years and is the world's largest maker of tractor winches.

The proving ground for Hyster equipment—as for "Caterpillars" — has been the tough towing, lifting and moving jobs around the globe. Long experience with the requirements of construction men in every country accounts for the heavy-duty service of the "Caterpillar"-Hyster combination.

Hyster tractor equipment is sold and serviced by more than 300 "Caterpillar" distributors and dealers throughout the world. One of them is near you. Ask him about Hyster models that will help in your work —or write direct for literature.

PIONEERS IN MATERIALS HANDLING EQUIPMENT

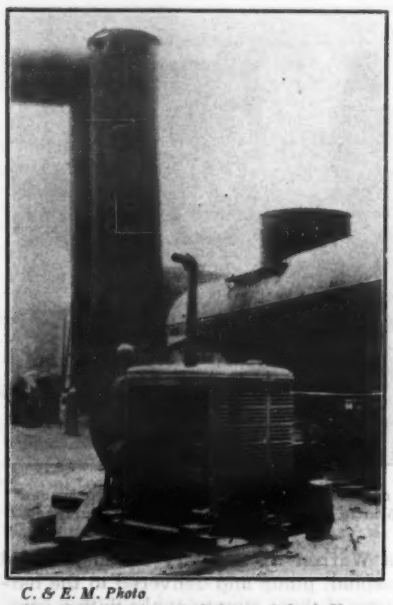
Extra power...extra pull. "Caterpillar" D7 equipped with a Hyster double drum Tractor Donkey.

HYSTER COMPANY

2952 N.E. CLACKAMAS STREET
PORTLAND 8, OREGON

1852 NORTH ADAMS STREET
PEORIA 1, ILLINOIS

● World's largest manufacturer of Tractor Winches. Builders of Hyster Industrial Trucks. Service Offices in principal world cities.



C. & E. M. Photo
An elbow connected to a 6-foot-diameter suction fan driven by an International UD-14 diesel replaced the metal stack, to remove excess fines from the twin aggregate driers.

Well Laid-Out Plant For Hot-Mix Contract

(Continued from preceding page)

bined capacity of 25,000 gallons. For use in the plant, the hot asphalt was delivered to the pugmill by the Barber-Greene plant pump.

Lime dust for the top course was delivered by the James River Hydrate & Supply Co. of Buchanan, Va., by freight, 800 bags per box car, to the second siding and was unloaded by hand for storage on a heavy timber platform between the spur and the plant. Warner hydrated lime, also in bags, came in by box car and was used to make a thick whitewash for daily swabbing of the beds and sides of the dump bodies of the trucks hauling the hot-mix to the road.

A roadway was excavated about 3 feet below ground surface immediately in front of the delivery end of the Barber-Greene plant so that the truck bodies would be at the proper elevation for loading. This was paved with concrete to prevent miring. Due to the heavy rains and high ground water, this depression quickly filled with water so a 2-inch Jaeger Sure-Prime pump was kept handy to unwater it. In addition, a platform was built on the side away from the plant so that truck drivers standing on it would be at the proper elevation to rake the load easily and distribute it evenly in the dump body. An average of five trucks hauling 6 to 6½ tons per load was hired on a tonnage basis for the average 5-mile haul from the plant to the road. Every load was weighed on Winslow truck platform scales by the weighman hired by the contractor and checked at intervals by the State's Plant Inspector.

A 10,000-gallon storage tank located between the plant and the scales was provided for storing the asphalt emulsion used as a tack coat on the old surface before the binder was laid. The emulsion came in tank cars and was delivered to storage by a Jaeger 2-inch centrifugal pump. A Littleford 1,000-gallon pressure distributor was used to apply the tack coat through its spray bar.

The plant crew consisted of the Plant Foreman, L. N. Knotts, 2 men cleaning up in the aggregate cars, the craneman, an engineer who checked and oiled the plant, a burner man, 2 dust men, a fireman for the boiler, a scale man, and 2 laborers, for the one 12-hour shift.

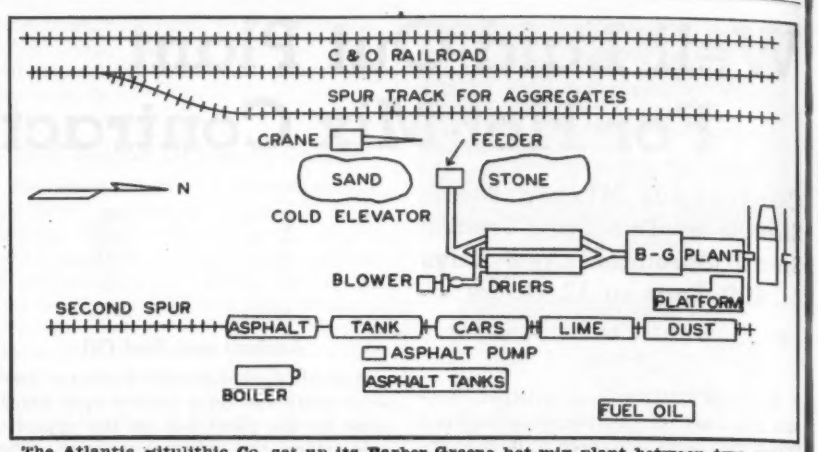
Laying the Hot-Mix

On U. S. 33 the plant-mix was laid in 12-foot strips by a Barber-Greene Tamping-Leveling Finisher geared to move at 16 feet per minute. When running binder the material was spread 1⅝ inches deep for a 1½-inch compacted thickness and on top 1⅜ inches loose for a 1¼-inch thickness after rolling. One ton laid 12 running feet of binder 12 feet wide, and 13 feet when running top. Whether running binder or top, the contractor tried to even the lanes by the end of the working day. The state specifications require that binder shall not be laid more than five days ahead of its covering with the top course. For compacting the long black ribbons, the contractor used a 7-ton Buffalo-Springfield tandem roller for breakdown and a similar 10-ton machine for final rolling.

On the road, the laying crew consisted of the Superintendent, one man dumping the trucks into the hopper of the finisher, the machine operator, one screed man, and two rakers.

Personnel

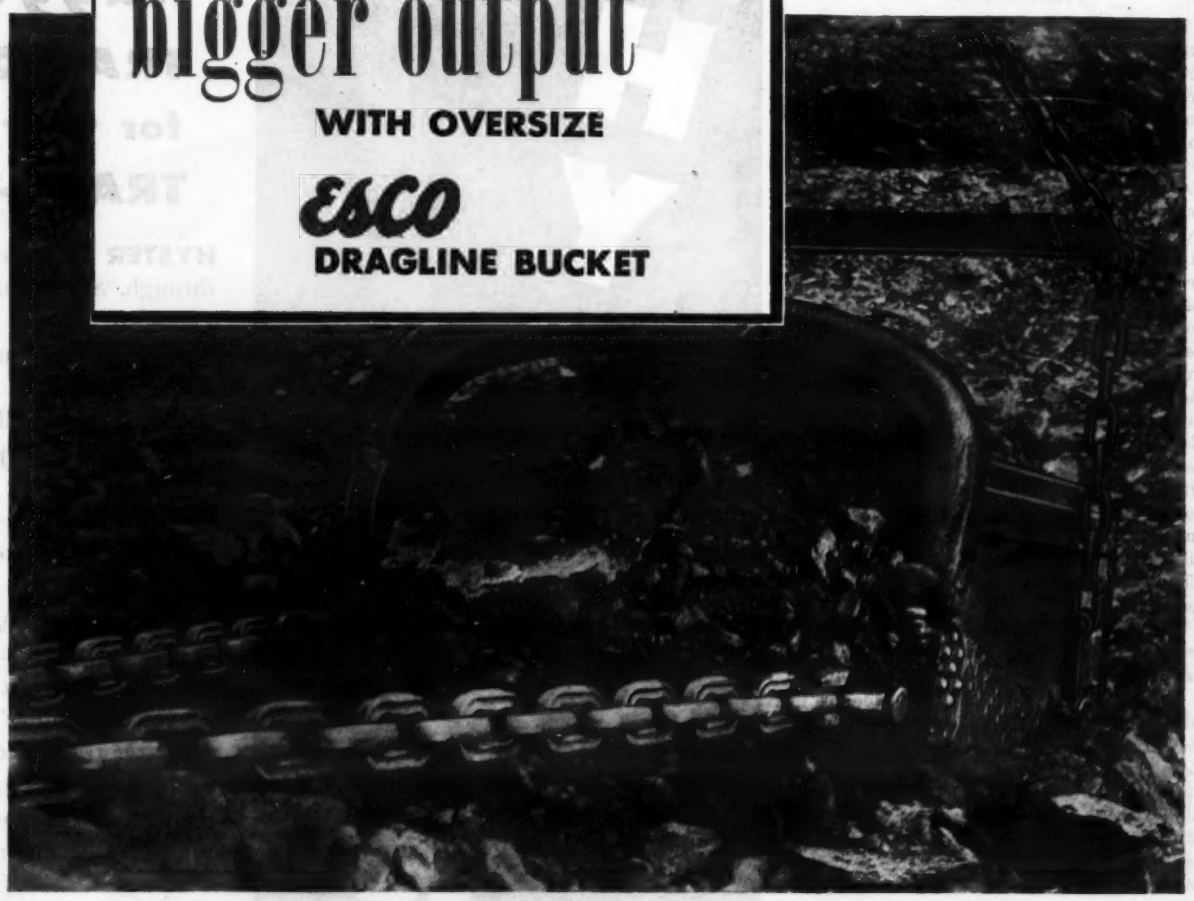
The 8.2-mile maintenance surfacing contract on U. S. 33 between Louisa and Mineral, Va., was completed by the Atlantic Bitulithic Co. of Washington, D. C., with A. W. Inabinet as Superintendent. For the Virginia Department of Highways, J. J. Forrer is Maintenance Engineer, and on this contract C. H. Coffman was Inspector.



The Atlantic Bitulithic Co. set up its Barber-Greene hot-mix plant between two spur tracks, and turned out an average of 400 tons a day.

Regular and thorough lubrication is an important factor in the service life of your machines.

bigger output
WITH OVERSIZE
ESCO
DRAGLINE BUCKET



POUND FOR POUND, Esco manganese steel dragline buckets carry greater payloads than other makes. This is the result of their manganese steel construction which makes Esco buckets both lighter and stronger. Power is used for moving payload instead of bucket dead weight.

Typical of the greater output of these Esco buckets are results obtained by the Mauger Construction Company of Zanesville, Ohio. Here the 15-yard bucket shown above was used to strip overburden from coal deposits. The overburden on this operation is from 40 to 80 feet deep, consisting mostly of sand rock, which is shot by both horizontal and vertical drilling.

The bucket, operated on a 9W Monighan with 160 foot boom, is oversize for this equipment, but is entirely practical, due to its light weight. Large pieces are handled effectively by the extra wide mouth. Better digging is achieved by the exclusive Esco tooth and front design.

We'd like to give you full information about these lighter, stronger Esco dragline buckets. Write or wire us today.

ELECTRIC STEEL FOUNDRY
2141 N. W. 25th AVENUE • PORTLAND 10, OREGON
OFFICES AND WAREHOUSES

SEATTLE, 4 — 2724 First Ave. S. — Elliott 4161
HONOLULU, 5 — 814 Kapiolani Blvd. — Phone 6486
NEW YORK, 17 — Graybar Building — Lexington 28958
SAN FRANCISCO, 7 — 699 Second Street — Douglas 8346
SPOKANE, 8 — 121 S. Monroe St. — Main 5530
LOS ANGELES, 11 — 2700 Santa Fe Ave. — Lucas 7251
CHICAGO, 1 — 221 N. La Salle St. — Dearborn 2284
EUGENE, ORE. — 1991 Sixth Ave., W. • Phone 5012
IN CANADA—ESCO LIMITED, 1084 Homer St., Vancouver, B.C. Telephone Marine 2343

Smythe Succeeds Father As Thew Shovel Co. Head

The election of C. B. Smythe to the office of President was announced recently by the Board of Directors of the Thew Shovel Co., Lorain, Ohio. A Vice President of the firm since 1920, Mr. Smythe succeeds his father, F. A. Smythe, who died recently after 46 years as Thew's first president. Mr. Smythe is a Director of the Manufacturers Division of the American Road Builders' Association, and is also serving as Chairman of the Promotion Committee of the Power Crane and Shovel Association.

Air-Tool Catalogs Ready

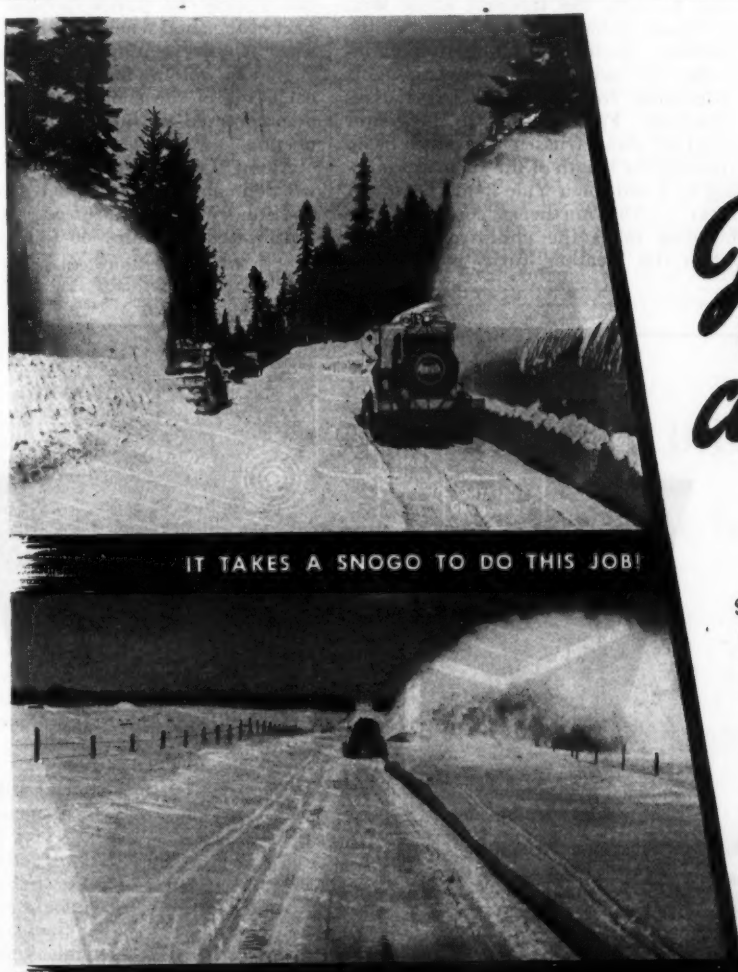
An extensive line of sinker, stoper, and drifter rock drills, paving breakers, clay and trench diggers, sump pumps, portable saws, backfill tampers, and other tools produced by the Independent Pneumatic Tool Co. under the trade name Thor is described in Catalog 42-A, recently issued by that firm. The catalog also covers various accessories, including air and water hose, hose fittings and couplings, a concrete surface grinder, and various blades, drills, chisels, etc., for use with Thor tools.

Another Thor catalog is No. 52-B which features air tools of interest to maintenance shop men. Hoists, grinders, air drills, wire brushes, sanders, safety and torque balancers for tools, as well as various Thor electric tools, are shown.

Either catalog may be secured on request by mentioning this review when writing to the Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.

Black-Top Road Mileage

The mileage of state, county, and township highways and roads and city streets paved with asphalt in the United States is 460,000 miles, which represents 71 per cent of the total paved mileage. These figures are based on recent studies made by The Asphalt Institute.



BREAKING OUT DRIFTED ROAD—NO BANKS BUILDING UP HERE

SIDE CASTING—A WIDER SAFER HILLSIDE ROAD

BREAKING OUT A DRIFT—NOTE THAT SNOW STREAM

If SNOGO can't do it—no other snow plow can!

Snogo should be the mainstay of every highway snow removal fleet. Here is a tested machine—tested by years of operation in every type of snow condition known to highway men in the country. When you buy Snogo you are buying dependability!

Let us show you a Snogo at work this winter. You'll note that the wide range of travel speeds permits perfect handling for any type of snow.

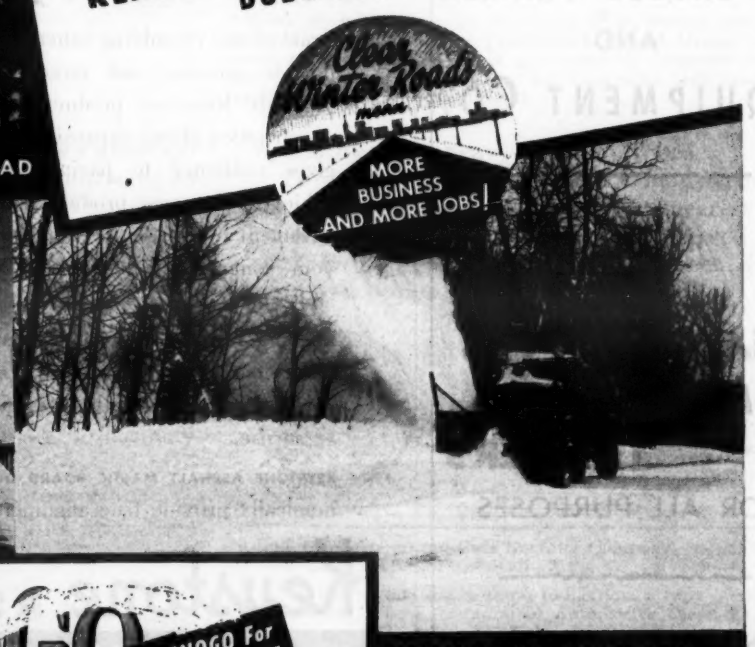
Even feed, a full discharge results in a bigger load of snow thrown farther than you have ever seen snow thrown by any type of plow.

Snogo's simplicity—one fan, freedom of discharge complications, smooth transmission of power and tested hydraulic controls—means trouble-free service and lower cost operation.

Snogo is the best insurance that any highway department can have for full snow control. Snogo puts the snow off the road, eliminates those roadside banks that trap and clog once cleaned out roads, reduces repeat plowing and removes drifts that will block other types of plows.

If Snogo can't do it no other type plow can.

KLAUER MANUFACTURING CO.
DUBUQUE, IOWA



PUTTING THE BANKS INTO THE WOODS

SNOGO A SNOGO For EVERY BUDGET

Typical District Shop Has Seven Buildings

In Addition to Facilities For Equipment Repair, Shop Also Repairs and Paints Highway Signs

✦ THE Engineering Division of the South Carolina State Highway Department is divided into four districts, each covering eleven or twelve counties of the state's total of forty-six. The Western District office at Greenville serves the northwest corner of the state; in the northeast section, the Northeastern District office is located at Florence; at Orangeburg, the Southeastern District office looks after the southeastern triangular-shaped area north of Georgia. The Central District office is located at Columbia, the state capital, and supervises the work in eleven counties in the central part of South Carolina. The personnel of each district office consists of a district engineer in charge, an assistant district engineer, an engineering office assistant, and such stenographers and clerks as are needed. Each district office supervises all road construction, road maintenance, and equipment maintenance carried on within the district.

State highway maintenance in each county is supervised by a maintenance superintendent, with headquarters at the state highway maintenance shop for the county. The maintenance superintendent is in charge of all road and bridge maintenance within his county and of the maintenance and repair of the equipment assigned to him.

The Eau Claire shop, on U. S. 21 just north of the Columbia city line, maintains all highways in Richland County and a small part of Lexington County, embracing 334.7 miles of roads under maintenance, of which 18.3 miles are in the city of Columbia. This mileage is divided as follows:

Type	Miles
Hard surface (concrete, or asphalt on concrete base)	140.3
Bituminous surface	96.3
Improved earth	20.0
Unimproved earth	78.1
Total	334.7

The plant at Eau Claire is slightly larger than some of the other shops in the Central District since it includes a storage shed for certain district equipment, and a sign repair shop where all road and marker signs in the district are serviced. Some special equipment repair for the smaller shops is done at the Eau Claire shop, because of the more complete layout of shop service equipment there, but as a general rule each county shop repairs its own road equipment. Built in 1929 and laid out on a 3½-acre plot, the Eau Claire maintenance plant comprises seven buildings including an office, machine shop, sign-painting shop, asphalt-storage shed, blacksmith shop, and two truck-storage sheds.

The area is encircled by a wire-strand fence which has two 20-foot gates in the west end for entrance and exit. Just inside the compound is an 18 x 24-foot office constructed with corrugated-metal walls and roof. Part of this space is given over to the storage of motor oil for servicing cars which are fueled at the gasoline pump at the south side of the office. The refueling area adjacent to the pump is paved with concrete.

Machine Shop

East of the office is a 27 x 60-foot machine shop, also of corrugated-metal construction, with a concrete foundation and floor. Opposite each other in the north and south walls are sliding doors, 14 feet wide x 10 feet high, which also help to light the interior, along with casement windows on each side of the building. Artificial illumination is furnished by two rows of electric lights suspended from the wooden trusses overhead. Fastened also to the center point of these trusses is a steel beam running the length of the shop and serving as a rail for a Yale 3-ton hoist. A stove in the northeast corner of the building takes the chill from the air when the weather turns cool in the winter.

In the northwest corner of the machine shop is a 15 x 18-foot enclosure used for a storage room where small parts are kept in wooden bins around three walls. Along the other wall are stored tires and bulkier parts and accessories. Occupying a similar-size area in the southwest corner of the shop is the wash room with shower and lavatory.

Alongside the store room is kept a Lincoln 300-amp electric welder mounted on four steel wheels and equipped with a 50-foot lead so that it can readily be pulled around to any part of the shop where it is needed. The shop is also equipped with an oxy-acetylene welding and cutting unit. On each side of the shop near the door is a compressed-air outlet with hose connection.

Along the north wall is a five-shelf wooden cabinet where small tools, dies, and sundry items are stored. Here also are located a Manley 40-ton hydraulic

(Continued on next page)

LA CROSSE TRAILER AND EQUIPMENT CO.

Manufacturers

OF

HEAVY DUTY MACHINERY TRAILERS

FOR ALL PURPOSES

INFORMATION ON REQUEST

LA CROSSE - WISC.

Keystone PAVING PRODUCTS

make every concrete road job better

Cracked and crumbling concrete pavement is often due to obsolete and unnecessary construction methods. Keystone products and Keystone joint construction allows expansion and contraction and gives resilience to paving slabs never before achieved. Keystone products cut costs or prolong pavement life, or both. And Keystone supplies all your concrete paving needs except sand, gravel and cement. *All from one source.*

KEYSTONE TONGUE AND GROOVE JOINT—provides maximum load-bearing efficiency and longer paving life. Recommended for both longitudinal and transverse use.

KEYSTONE ASPHALT MASTIC BOARD DUMMY JOINTS—economically provide true alignment without expensive installing machinery. Waterproof, rigid, easy to handle, low in cost.

KAPCO CURING COMPOUND—an easily applied membrane type, transparent liquid. Retains maximum amount of mixing water. Adheres to wet surfaces. No discoloration . . : no slick surfaces.

OTHER "ROAD TESTED" KEYSTONE PRODUCTS—Asphalt Joint Sealing Compound, Kapco 336 Rubber Asphalt Joint Sealing Compound, Crack Fillers, Subgrade Papers, Sewer Pipe Joint Compounds, Fibre and Asphalt Expansion Joints, Cap Plates and Installation Channels, Waterproofings.

Send for free illustrated catalog, price list and details of Keystone's complete "one-source" service. Free paving plans and engineering advisory service included. Write today to Dept. 114.

Keystone ASPHALT PRODUCTS CO.

A DIVISION OF AMERICAN-MARIETTA COMPANY

GENERAL OFFICE: 43 EAST OHIO STREET, CHICAGO 11, ILLINOIS

MANUFACTURING PLANT: CHICAGO HEIGHTS, ILLINOIS

Typical District Shop Has Seven Buildings

(*Continued from preceding page*)

press and a 100-pound anvil. At the east side of the building is an 18-foot-long wooden work bench, 3 feet wide and covered with a sheet-metal top. At each end is a 6-inch bench vise, while mounted along the middle are a Black & Decker No. 6 drill press and a Sioux valve-refacing machine. In the center of the room is a 48 x 30-inch metal-topped table on which truck or tractor engines are either assembled or dismantled.

Another metal-topped table, 5 x 4 feet, is situated along the south wall on which are mounted Black & Decker 7 and 10-inch bench grinders. Next to this is a South Bend 16-inch x 10-foot lathe driven by a Westinghouse motor; lathe tools are stored in an adjoining cabinet. Batteries can be charged in 30 minutes on a fast charger which is located near the south doorway, together with an Auto-Lite spark-plug cleaner. The shop equipment includes a Blackhawk 4-ton floor jack, and fire extinguishers are placed around conveniently on the walls.

Outside the machine shop at the east end of the building is a 40-inch-high loading ramp and platform, 30 feet long x 12 feet wide, made from 6 x 6-inch sections of creosoted lumber. Trucks back up to the end of this platform and unload heavy materials quickly and easily on the same level with the floor of the truck. Heavy road machinery is also loaded smoothly on trucks from this wooden platform.

Sign Shop

A little further east is a 27 x 60-foot corrugated-metal sign shop which has two 12 x 12-foot sliding doors opposite each other in the north and south walls. Suspended overhead between these doors is a steel beam on which rides a Yale 1-ton hoist used for loading and unloading signs brought to the shop. Road signs made of metal are bought from the state penitentiary at Columbia where they are fashioned by convicts, but are repaired and reconditioned here. Wooden signs are made in this shop on a Crescent wood-working machine consisting of a rip saw, planer, and band saw. Few wooden signs have been made lately, however, because of the great scarcity of lumber. This shortage has been so severe that the State in some cases has been forced to tear down wooden guard rail to get material for urgent repairs to wooden bridges.

The first step in the reconditioning of the metal signs is removing the old paint. This is done outside the sign shop in a large vat made from the 7 x 6-foot steel body of a 1½-ton dump truck which was welded at the tail-gate and sides to make a watertight compartment. This improvised vat was erected on a brick base, hollowed in the center so that a fire could be built beneath it, and equipped with a 4-foot-high brick chimney at the side to assure a good draught. The paint is removed by boiling the signs in an Oakite solution, after which they are flattened out and put in shape by pounding them with hammers on a metal-top table.

At the east end of the shop is a 3 x 12-foot metal-top work bench on which are mounted a Black & Decker 8-inch bench grinder and a Sioux ½-inch heavy-duty drill. The metal signs receive a final cleaning here and holes are drilled when necessary. Then the signs go to a 27-foot-square room in the west end of the shop where they are painted, and the symbols or letters are applied with a stencil and brush. In this building is also located a Gardner-Denver 20-cfm air compressor which supplies the entire plant with compressed air.

Asphalt Storage

To the north of the sign shop is a 10 x 40-foot wooden building where asphalt with a 150 to 200 penetration is stored in barrels until needed in some road-maintenance operation. Old road signs are hung along the north side of this building on racks while waiting to be reconditioned. East of the sign shop is a 10,000-gallon asphalt-storage tank consisting of an old railroad tank car set up on two concrete footings. This tank is near the eastern end of the lot, and close to a siding of the Seaboard Railway where asphalt tank cars are parked while they unload through a 60-foot underground connecting pipe to the storage tank. A Deming No. 6 pump driven by a Ford V-8 engine unloads the asphalt from car to storage tank after a 1,000-mile trip from the Talco Division refinery of the Southport Petroleum Co. at Mount Pleasant, Texas. The portable power pump used to unload the cars was constructed by the Department's maintenance forces.

Asphalt is taken from this plant to the job site in three 700-gallon tanks which are loaded on dump trucks and hauled to where the maintenance crews are working. These feeder tanks were designed by the Department's engineers and fabricated by local machine shops. Some are insulated with asbestos.

Other Buildings

In the center of the shop yard is a small 12-foot-square blacksmith shop of corrugated-metal construction with a concrete floor, in which are located a 3 x 4-foot forge with a Champion blower, a 200-pound anvil, a work bench, and hand vise.

On one side of this shop is a concrete grease pit where equipment is lubricated with a Balcrank grease gun driven by compressed air. Dirty crankcase oil is drained into a 500-gallon tank from where it is later pumped into a distributor and applied to dusty roads. On the other side of the shop is a wash rack consisting of a 6-inch concrete slab, 14 x 16 feet in size, with a small drop inlet at the center of the drain.

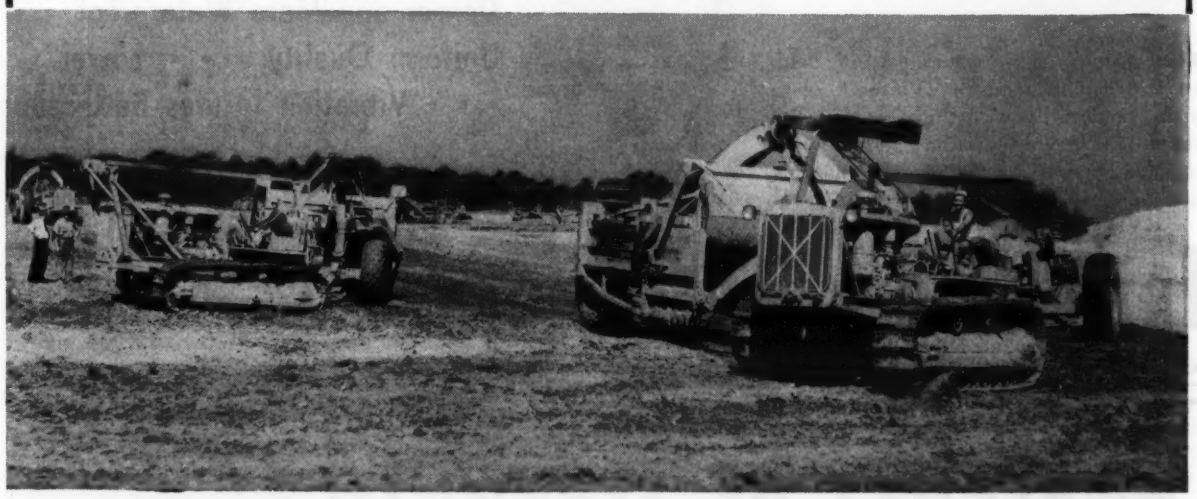
The new General Model 105 is taken on a "test flight" by Peggy Sanny, former WASP pilot, who has flown over 300 hours in B-17's and B-24's. Mrs. Sanny, who is the daughter of Ralph C. Parker of the Wood Tractor Co., Portland, Oreg., General distributor in that territory, reports this new all-purpose unit much simpler to operate and fully as exciting as flying.

In the northwest part of the lot are the two truck-storage sheds. One of these is a long building, 173 x 35 feet, of corrugated-metal construction, with

(*Concluded on next page*)

"GULF DIESELUBE H.D. keeps our engines clean, helps us get better performance and lower operating costs"—

*says the Contractor on this Airport project**



* Frank Mashuda Company, Mansfield, Ohio, recently completed the grading contract for the $3,000,000 Mansfield Airport project, which required the removal of approximately 2,000,000 yards of dirt. Gulf Dieselube H.D. helped this Contractor keep equipment on the job and operating efficiently.

"GULF DIESELUBE H.D. has done a great job for us," says Frank Mashuda, Contractor on the Mansfield, Ohio, Airport project. "This heavy-duty oil keeps our engines clean—provides the kind of lubrication for both our gasoline and Diesel equipment that means better performance and lower operating costs."

Use Gulf Dieselube H.D. in your equipment and see how it can help you cut down on repairs and overhauls. Take advantage of the extra value you are offered in these four points of superiority in Gulf Dieselube H.D.:

1. Detergent action helps keep motors cleaner.
2. Helps prevent ring sticking and minimizes cylinder wear.
3. Noncorrosive to alloy bearings.
4. Nonfoaming under all temperature conditions.

Gulf Dieselube H.D. is approved and recommended by leading manufacturers for both automotive-type Diesels and for gasoline engines operating under heavy-duty conditions.

For further information on this modern heavy-duty oil, write, wire, or phone your nearest Gulf office today. If you have not yet received your copy of the new Gulf Diesel Lubrication Book, send the coupon below.

GULF

Gulf Oil Corporation · Gulf Refining Company

DIVISION SALES OFFICES:

Boston · New York · Philadelphia · Pittsburgh · Atlanta
New Orleans · Houston · Louisville · Toledo

Gulf Oil Corporation, Gulf Refining Company C&EM
3800 Gulf Building, Pittsburgh 30, Pa.

Please send me, without obligation, a copy of the new Gulf book, "The Lubrication of Automotive Diesel Engines."

*Name*_____

*Company*_____

*Title*_____

*Address*_____

Typical District Shop Has Seven Buildings

(*Continued from preceding page*)

wood trusses and concrete floor. At the east end of this structure is a 9 x 35-foot section where the new or rebuilt signs for the entire district of eleven counties are stored on racks. This shed contains fourteen 9-foot-wide stalls, 35 feet deep, where trucks, tractors, rollers, and other heavy equipment are stored. In another section 18 feet wide and the full depth are kept four passenger cars. Two 10 x 35-foot supply rooms complete the building; one houses recapped tires, locked up with chains, while the other is used to store miscellaneous material such as oil, greases, grease guns, picks, and shovels.

The other truck-storage shed is a temporary wooden structure, 35 x 96 feet, open on the sides and used solely for equipment storage. Around in the yard are stored sand, stone, pipe, and miscellaneous equipment.

Personnel and Equipment

Prior to the war, the Eau Claire maintenance plant had a complement of 45 men which was reduced to 26, consisting of a superintendent, 6 foremen, a clerk, a mechanic, an assistant mechanic, 2 machinists, and 14 truck drivers. A total of 78 pieces of equipment are maintained at this shop, including 36 trucks, mostly 1½-ton size; 7 tractors; 5 rollers; 2 power graders; 8 pull-type graders; 2 distributors; 5 mowing machines; an asphalt boiler; a Cement Gun; 2 portable air compressors; 2 trailers; a concrete mixer; a conveyor loader; 2 lighting plants; 2 bituminous mixers; and a center-line marking machine. In addition, the shop maintains several highway patrol cars.

F. C. DeVore is Superintendent of the South Carolina Highway Department shop at Eau Claire.

A Correction

On page 2 of the November issue of CONTRACTORS AND ENGINEERS MONTHLY, in an article on the construction of the Hawkesbury River railroad bridge in Australia, it was erroneously stated that the 183-foot pier foundations are the deepest in the world. This record actually belongs to pier E-3 of the San Francisco-Oakland Bay Bridge which is 243 feet below water level. This was brought to our attention by C. B. Jansen, General Manager of the Contracting Division of the Dravo Corp., Pittsburgh, Pa., who was General Superintendent for Bridge Builders, Inc., on the San Francisco work.

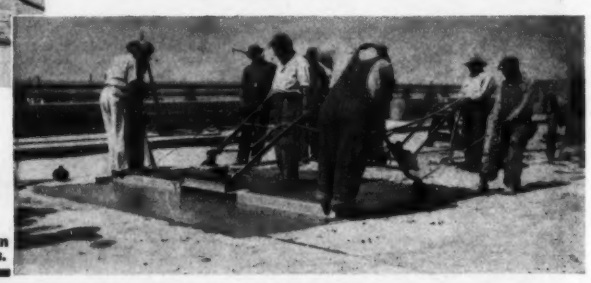
Better Re-surfacing and Repairing with...

PRESSURE VIBRATION

These pictures show surface-patching with an International Pressure Vibrator, on a main boulevard, with heavy traffic of about 30,000 vehicles daily. Perfect bonding was obtained by this modern vibrating method.

Extensive tests during many years of service, have proved that the "Pressure Vibration" method produces a harder, denser, concrete surface of greater strength and uniformity, unaffected by climatic or ice removal methods. These results are obtained through "Pressure Vibration" which insures an absolute bond between the old concrete and the *new* concrete wearing surface.

Harder Concrete • Greater Strength • Denser and More Waterproof • • • Uniform Quality • • • Lower Cost • • • Vibration Insures Better Bond



• *Submit Your Vibration Problems to Us*

INTERNATIONAL VIBRATION COMPANY

16702 Waterloo Rd., CLEVELAND 10, OHIO

Also manufacturers of Standard Vibratory Units for General Concrete Construction —Foundries—Cement Block Molds—Material Handling and Industrial Applications.

PLENTY OF STRENGTH

FOR THE *Biggest Loads*

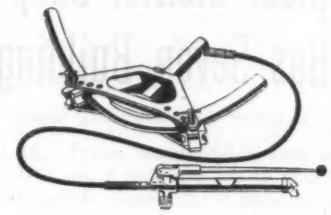
Look at all the strength built into a Jahn trailer! Deep, wide flange, main beams run the full length. Loads are equally distributed and transferred to these main beams through numerous cross-member beams. Note particularly that cross-members and outriggers are I-beam sections, not channels. All connections where steel meets steel are electric welded to provide extra strength.

Jahn heavy duty trailers are offered in a wide range of sizes from 5 to 100 tons with any wheel or axle combination in semi-trailer or full-trailer models. Special trailers built to order to fit any need. Send for new catalogs just off the press. Mention capacity of trailer you want.

C. R. JAHN COMPANY

1347 W. 37th Place, Chicago 9, Ill.

"Come to Trailer Headquarters"



When you buy a

BENDER

...check to make sure you get these features:

EASY TO GET TO THE JOB

☑ Lightweight, portable—one man can easily take a Blackhawk Pipe Bender right to the job. Bends rigid conduit and pipe in all popular sizes, up to 4" diameter.

WORKS AT ALL ANGLES

☑ The compact hydraulic Porto-Power Ram is all-directional. Power eliminates need for heating the pipe.

WORK OVERHEAD

☑ All-directional operation and light weight enlarges range of utility to use on ladders, scaffolds and cramped quarters and work on existing pipe runs.

SIGHT FROM ANY ANGLE

☑ Remote control permits operator to stand in any position for a full view of the job. Saves need for elbows, couplings, cutting and extra threading.

DETACHABLE POWER UNIT FOR EXTRA UTILITY

☑ It pulls gears, lifts machinery, and licks scores of other trouble jobs.

BLACKHAWK Porto-Power PIPE BENDERS

BLACKHAWK MFG. CO.
Dept. P-1826, Milwaukee 1, Wis.
Mail Hydraulic Equipment catalog to:

NAME _____

COMPANY _____

ADDRESS _____

Six Concrete Spans On 16-Mile Project

Standard Design for H-20 Loading; Two Contractors Contended With Floods And Labor Shortage

(Photo on page 1)

✦ THE reconstruction of U. S. 11 in west-central Alabama, from the Mississippi state line eastward 16 miles to the town of Livingston, included the building of six reinforced-concrete bridges varying in length from 72 to 852 feet, and the widening of three other bridges from a 20 to a 27-foot roadway. The highway was graded and paved with 8-inch plain concrete 22 feet wide under two contracts, (see C. & E. M., December, 1945, pg. 1), which divided the project into almost equal sections. Heavy rains during the month of April when the bridge construction was getting under way gave the contractors trouble, but the greatest difficulty encountered was the shortage of men to work on the bridges.

Construction of the eastern section between the towns of York and Livingston was under contract to E. J. & W. L. Cobb, Inc., of Montgomery, Ala., which sublet the construction of three bridges and a culvert, together with the widening of three other bridges, to the Forcum-James Co. of Dyersburg, Tenn., for $105,636. On the western end of the project, three bridges were built by T. H. Pearce of Columbus, Ga., on his low bid of $83,950.

Bridge Design

The bridges were built to standard Alabama Highway Department design for H-20 loading, with a 26-foot roadway and 1½-foot curb-walks cantilevered on either side. The concrete bents on the small bridges are spaced at 24 feet and on the bridge over the creek at 34 feet, and consist of two concrete column piers, 2 feet square, from 12 to 30 feet high, and 16 feet on centers. On the smaller bridges these columns rest on concrete footings 7 x 4½ x 2 feet deep which have a foundation of six untreated-timber piles averaging 22 feet long. The footings on the larger bridge are 7 x 7 x 3½ feet deep and are supported on nine piles. Piling was necessary because of the low bearing value of the soil in this region. Across the top of the piers are caps, 24 feet 2 inches long x 3 feet wide x 2 feet 9 inches deep, supporting the superstructure consisting of four deck girders, 1 foot 4¾ inches wide with an average depth of 1 foot, spaced 5 feet 11¼ inches on centers, on which rests the 6¾-inch reinforced-concrete slab.

T. H. Pearce Contract

The three reinforced-concrete bridges constructed in the west section by T. H. Pearce are 72, 96, and 388 feet long and replace old timber bridges; the two smaller bridges cross marshy areas to serve as flood-relief openings, while the long bridge spans Toomsuba Creek. During most of the year but little water passes under the small bridges, and Toomsuba Creek is seldom more than a foot or two deep, except when flash floods fill the area with high water.

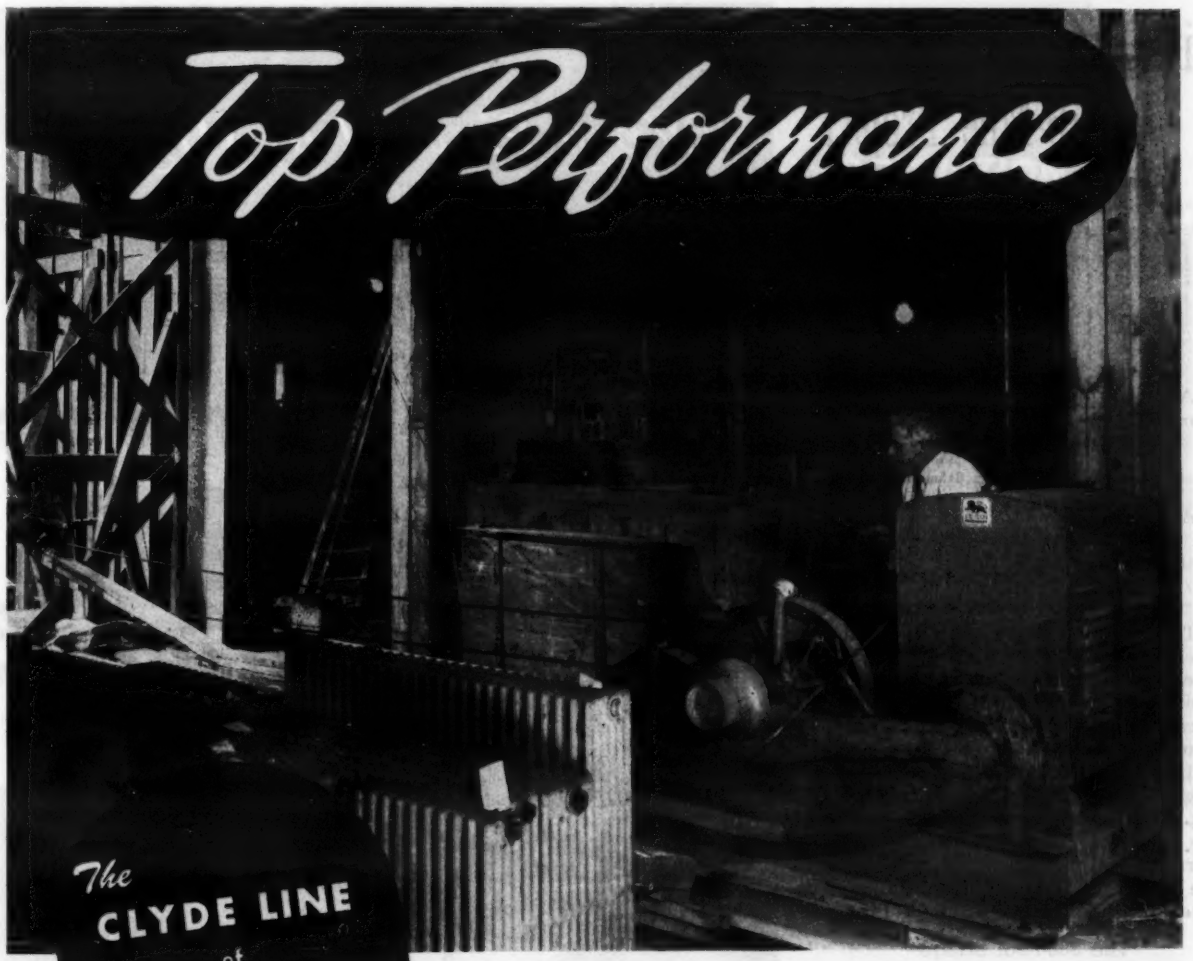
T. H. Pearce started work on the 96-foot bridge first by driving the 10-inch wood foundation piles to 18 to 20-ton bearing with a 3,000-pound gravity hammer working in 30-foot leads on a Northwest crane with a 40-foot boom. The piles were then cut off so that they would project 1 foot into the concrete footings. The latter and the piers, together with the two 10-foot-high cantilever abutments, were then poured. The abutment wall is 1 foot thick, 32 feet long with a footing 4 feet 2 inches wide x 1 foot deep, and has a 9½-foot-long wing wall on each end. The pile driving and concreting were done when the ground over which the bridge was being built was sufficiently dry to support the crane and concrete mixer. Concrete was mixed in a Jaeger 3-bag mixer, poured into a 1-yard concrete bucket, and lifted to the forms by the crane.

To support the deck forms, timber falsework was erected between the piers. Two bents, 16 feet apart, were built for each 24-foot span, with eight posts, 6 to 8 inches in diameter, driven in each bent by the gravity hammer on the crane. Across the posts were placed 8 x 8-inch caps which supported eight 4 x 12-inch stringers, two under each beam. The beam forms were constructed of 1¼ x 8 or 1¼ x 10-inch tongue-and-groove stock, and rested on 2 x 4's, 24 inches long, spaced 12 inches on centers along the stringers. Lighter-weight lumber, ¾ x 6-inch tongue-and-groove stock, was used for the deck forms.

During the construction, traffic used the existing road and timber bridge which paralleled the new work at a distance of 30 feet. The Jaeger 3-bag mixer was first set up on the bank to pour the first deck span and was later moved across the bridge as the remaining three spans were poured. Sufficient water for the mix was delivered by a Jaeger 2-inch pump from a small stream below the bridge to a 500-gallon tank set up on a wooden platform whence it flowed by gravity to the mixer. A Jaeger 2-bag mixer was also kept on the job as a spare.

Sand and gravel were supplied by the Aliceville Sand & Gravel Co. at Aliceville, Ala., and shipped 60 miles over the Alabama, Tennessee & Northern Railroad to a siding at York, in the center of the project. From there it was hauled in two Ford and two Chevrolet dump trucks 5 miles to the bridge site. Bag cement was purchased from various cement companies in the locality. The aggregate, which was stockpiled alongside the mixer, met the following gradation:

(Continued on next page)



The CLYDE LINE of QUALITY EQUIPMENT

HOISTS
DERRICKS
WHIRLEYS
CAR PULLERS
HAND POWERS
BUILDERS TOWERS
MINE HOISTS
WINDLASSES
WINCHES
PILE DRIVERS
BARGE & DREDGE MACHINERY

Clyde Gasoline Hoists mean top performance . . . a reputation established by thousands of job tested machines. Top performance to you means better building schedules and less operating costs.

Clyde hoists are scientifically engineered and carefully constructed to give you more dollar-for-dollar value. Excessive weight has been eliminated with no sacrifice of strength . . . their practical design provides economy, efficiency and ease of operation.

Profit with a Clyde on your next job. Write for special bulletins giving complete specifications and construction details on any type of equipment. Clyde sales and service agencies are in all principal cities.

CLYDE

CLYDE IRON WORKS, Inc.
Duluth 1, Minnesota

C. & E. M. Photo

For the concrete pours on the Sucarnoochee bridge, Forcum-James used a 60-foot Insley tower mounted on skids and moved along by a 40-hp hoist as the work progressed.

Six Concrete Spans On 16-Mile Project

(*Continued from preceding page*)

Screen Size	Per Cent Passing Sand	Gravel
1½-inch	.....	100
1 -inch	.....	90-100
½-inch	.....	25-60
⅜-inch	100	.....
No. 4	95-100	0-10
No. 8	75-100	.....
No. 16	45-90	.....
No. 50	3-35	.....
No. 100	0-8	.....

A typical batch for the 3-bag mixer consisted of:

Cement	282 lbs.
Sand	591 lbs.
Gravel	846 lbs.
Water	18 gals.

A Mall vibrator was used throughout all pours and the deck slab was cured with wet sand.

Labor Shortage

The working force on the bridge averaged only thirteen men, of which five were carpenters and concrete finishers and the rest laborers, and their presence on the job was most uncertain. Some of this crew had to be transported as far as 65 miles from their homes each day by the contractor. During the pouring period, it was a customary sight to see Contractor Pearce, a former Auburn football tackle, not only operating the mixer but frequently pushing a wheelbarrow of concrete to the forms.

The 388-Foot Bridge

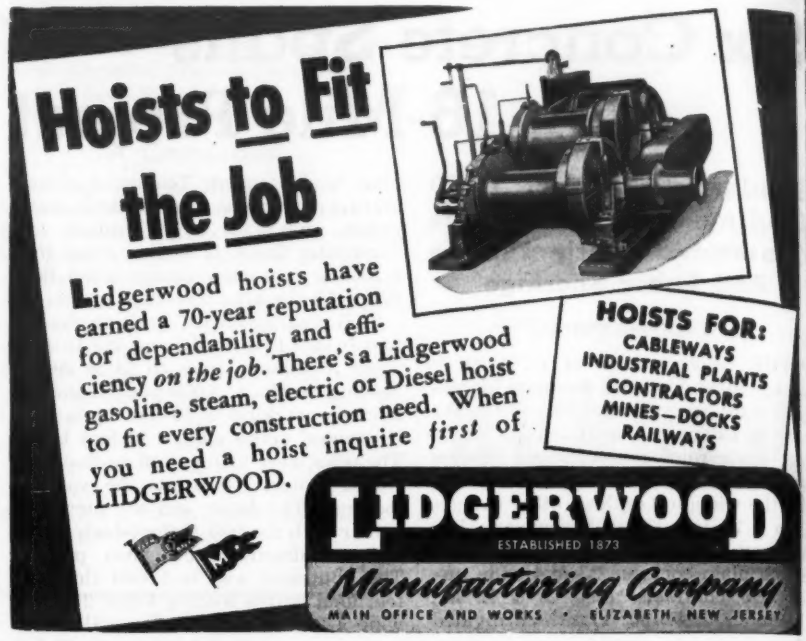
Construction of the three-span 72-foot bridge was similar to that of the 96-foot bridge, but the 388-foot bridge was built in the same location as the existing structure, which necessitated the erection of a temporary trestle for detouring traffic. The long existing bridge of timber construction with a 20-foot roadway had a main span at the center, for crossing Toomsuba Creek, composed of two concrete piers, 80 feet 8 inches center to center, which are retained in the new bridge, but the old steel truss was discarded for new girders. On top of the existing piers, which are 3½ feet wide, a 12-inch-thick concrete curtain wall, running the length of the piers, was built to support the plates for the girder seats.

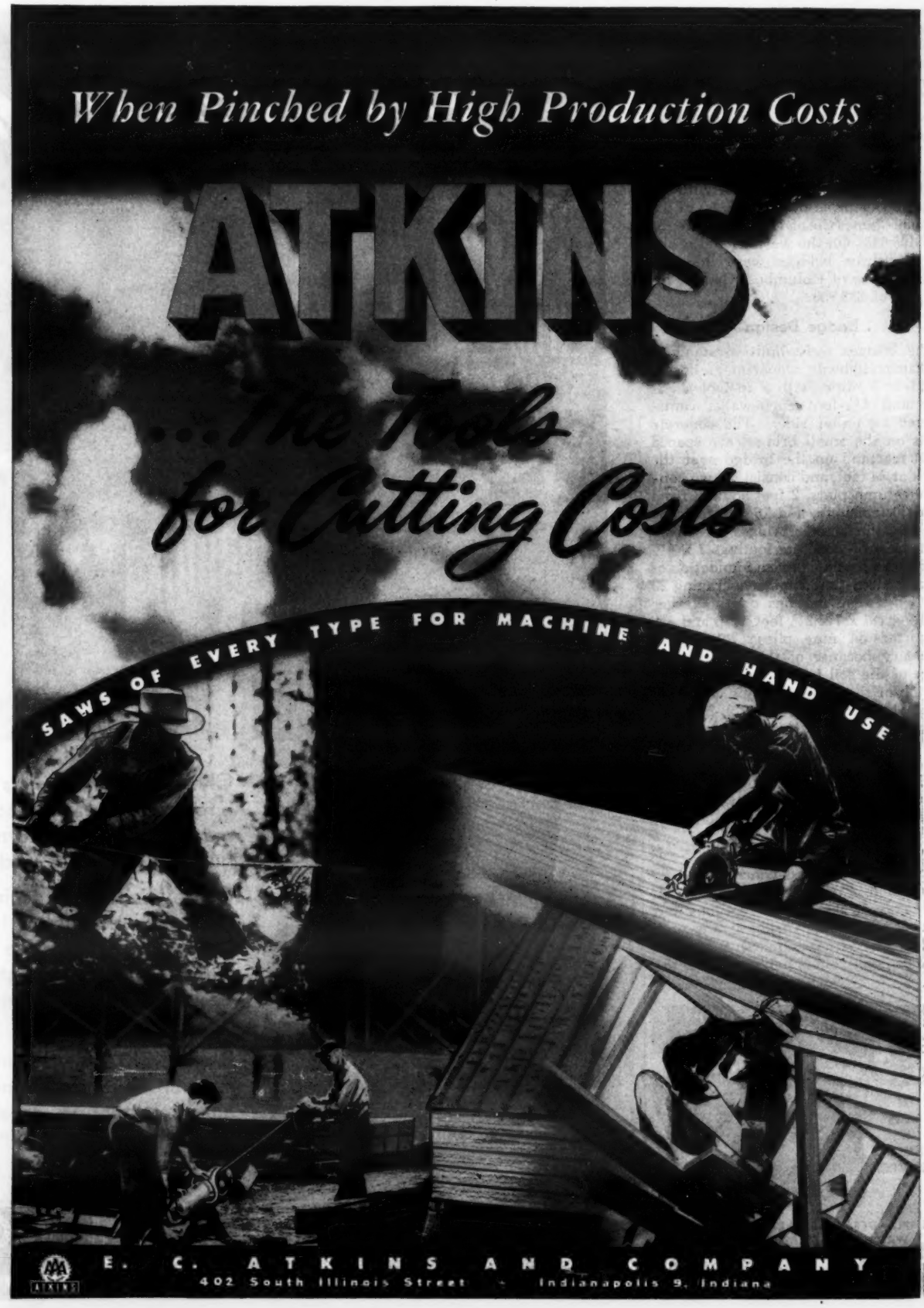
The temporary bridge was constructed on 4-pile bents of 10-inch-diameter timber piles 20 feet long and spaced 16 feet on centers. During the driving of these piles by the gravity hammer on the Northwest crane, the rig worked on the bed of the shallow creek which was not more than 6 to 10 inches deep. One night, however, a flash flood occurred which undermined the ground beneath the crane, overturning it into 4 feet of water. Work could not be resumed until the waters subsided, the crane was righted, and the engine overhauled.

On top of the piles were placed 12 x 12-inch caps on which were laid nine 8 x 14-inch stringers on 18-inch centers to support a 3-inch plank floor of assorted-size lumber. A hand-rail and wheel guard to provide a clear 18-foot roadway were the final touches to the temporary structure. All the timber except the piling used in this trestle came from the bridges being replaced at the eastern end of the project.

In addition to the nine 34-foot reinforced-concrete deck-girder spans on the Toomsuba Creek bridge, four steel girders carry the 7½-inch concrete slab across the main channel. The 80-foot girders are spaced 7 feet 4 inches on centers and consist of a 38 x 1½-inch web plate, four 6 x 4 x ⅞-inch angles, and a 16 x ⅞-inch x 58-foot cover plate on top. Floor framing consists of 18-inch 42.7-pound channels strung be-

(*Continued on next page*)


Hoists to Fit the Job
Lidgerwood hoists have earned a 70-year reputation for dependability and efficiency *on the job*. There's a Lidgerwood gasoline, steam, electric or Diesel hoist to fit every construction need. When you need a hoist inquire *first* of LIDGERWOOD.
HOISTS FOR:
CABLEWAYS
INDUSTRIAL PLANTS
CONTRACTORS
MINES—DOCKS
RAILWAYS
LIDGERWOOD
ESTABLISHED 1873
Manufacturing Company
MAIN OFFICE AND WORKS · ELIZABETH, NEW JERSEY


When Pinched by High Production Costs
ATKINS
...The Tools for Cutting Costs
SAWS OF EVERY TYPE FOR MACHINE AND HAND USE
E. C. ATKINS AND COMPANY
402 South Illinois Street - Indianapolis 9, Indiana

Six Concrete Spans On 16-Mile Project

(*Continued from preceding page*)

tween the girders at 9 feet ¼ inch on centers. Field connections were made with ⅞-inch ribbed bolts.

Quantities and Personnel

The major estimated quantities for the construction of these three bridges were as follows:

Excavation	898 cu. yds.
Concrete	1,157 cu. yds.
Untreated-timber piling	6,500 lin. ft.
Reinforcing steel	286,540 lbs.
Structural steel	69,200 lbs.

T. H. Pearce, the contractor, served as his own Superintendent while W. A. Smith was Resident Engineer for the Alabama Highway Department.

Forcum-James Co. Contract

On the eastern half of the road, the Forcum-James Co. of Dyersburg, Tenn., was, at the same time, widening three concrete bridges with span lengths of 35, 61, and 70 feet from a 20 to a 27-foot roadway. The existing curb and handrail were removed by Ingersoll-Rand pavement breakers driven by an air compressor, after which the roadway and curb-walk additions were cantilevered out on each side.

The three new reinforced-concrete bridges to replace timber structures are 72, 168, and 852 feet long. The first two, which are over low ground, are considered to be relief bridges from flash floods, and are made up of 24-foot-span deck girders constructed according to standard highway design similar to the bridges on the western end. The long bridge over Sucarnooche Creek has twenty-two 34-foot reinforced-concrete deck-girder spans, and one 104-foot steel-girder span over the main channel replacing a 104-foot truss span which was removed and dismantled by the contractor. State maintenance forces moved the steel 90 miles to Millport where the salvaged truss was re-erected over a creek.

The new main span consists of four girders 4½ feet deep which support a 9-inch concrete slab. The two existing piers on the old bridge were given an addition of a curtain wall on top, similar to the construction on the Toomsuba piers, to bring the new steel to the proper grade.

Excavation for the abutments and footings, which are similar to those on the western end of the job, was done by a Lorain 40 crane using a 35-foot boom and a 1¼-yard clamshell bucket. The piles were driven by the same rig, with the addition of 30-foot leads and a 3,000-pound drop hammer. Forms for the footings and piers were next built, aided by an electric SkilSaw, and these sections were then poured.

Bridge Superstructure

Falsework for the girder and deck superstructure was next erected, consisting of 6-pile bents of 10 to 12-inch-diameter gum wood, about 22 feet long. Each span had two bents, the piles of which were capped with 8 x 8's supporting eight 4 x 12 stringers, two to a beam. The girder forms were made from 2 x 10-inch tongue-and-groove boards with the bottoms resting on 2 x 6 studs, 3 feet long, spaced at 18 inches.

C. & E. M. Photo

For the construction of one of the bridges, a detour bridge was necessary. During its erection by a Northwest crane, a flash flood undermined the ground on which the crane was working, overturning it in 4 feet of water.

The aggregate came from the same source as that used on the other half of the road, and was delivered to a siding at Livingston where it was unloaded from the car by hand into a Chevrolet dump truck and hauled ¾ mile to a batch plant set up on the western bank of the creek. The bins, which held 170 tons of sand and gravel, were built on the side of a knoll so that the dump truck could unload directly into them. The contractor built a temporary wooden bridge over the creek for traffic to use since the new bridge occupies the same site as the old one.

For the concrete pours, a 60-foot Insley tower was used, mounted on skids with a cable off each end anchored to deadmen so that the Jaeger 40-hp hoist, powered by a Hercules engine, could move it along the ground at the side of the bridge as the pours advanced. Two or three Ford trucks with a divided compartment hauled 2

(*Concluded on next page, Col. 2*)

WON'T QUIT
or cause time out

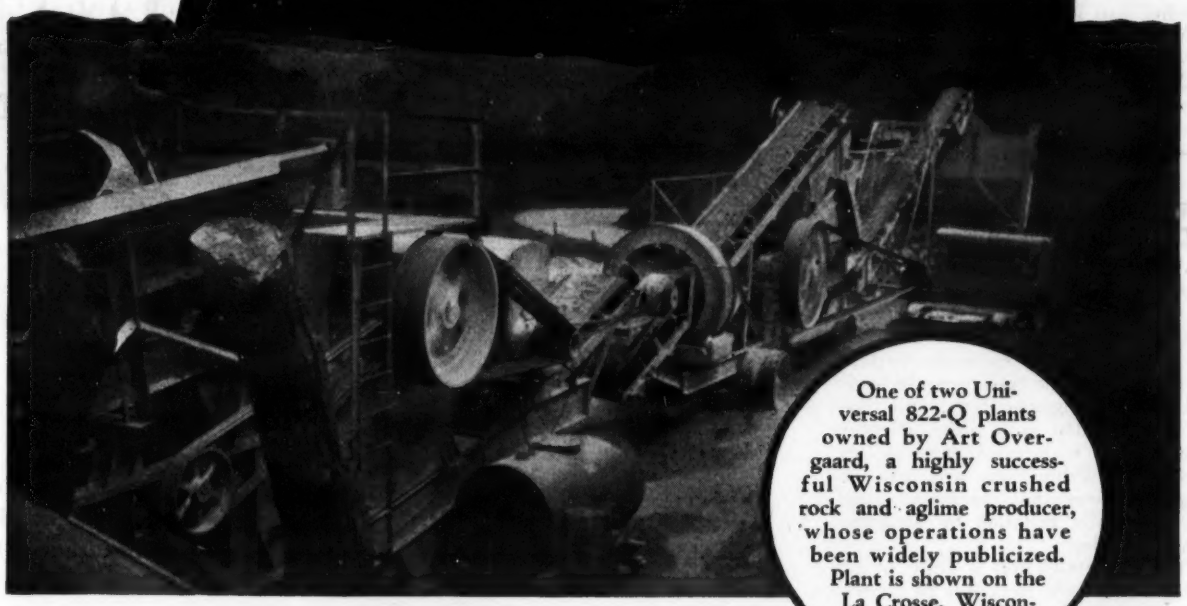
A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

•

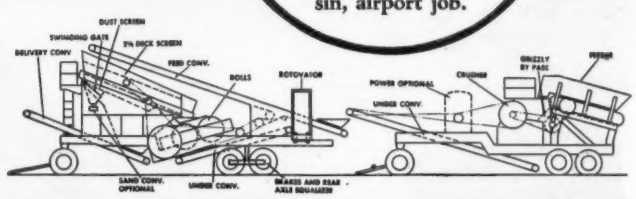
The Hayward Company
32-36 Dey Street
New York, N.Y.

Hayward Buckets

822-Q = { PORTABILITY + HIGH PRODUCTION



One of two Universal 822-Q plants owned by Art Overgaard, a highly successful Wisconsin crushed rock and aglime producer, whose operations have been widely publicized. Plant is shown on the La Crosse, Wisconsin, airport job.



PRIMARY UNIT SECONDARY UNIT

Typical of the many profit-proved Universal portable crushing plants, is the 822-Q crushing, screening and loading plant. Primary reduction is by a Universal 546-P Unit which consists of rugged, steel plate hopper with built-in apron feeder, bar grizzly and by-pass, jaw crusher and underconveyor. Maximum capacity and minimum jaw wear is assured, as material not requiring crushing is short circuited.

Screening and secondary reduction is by the Universal 800 Secondary Unit. Material is fed to the 2½ deck gyrating screen, where larger oversize is scalped direct to rolls from top deck, protecting lower decks from excessive wear and assuring maximum screening efficiency. Material retained on lower deck also goes to rolls—throughs, to mixing hopper and delivery conveyor—dust is rejected by ½ deck. Material from roll crusher is returned to screen via Rotovator, closing circuit. A double deck auxiliary gyrating screen may be set in oversize Rotovator for production of 100% chips for seal coating, if desired.

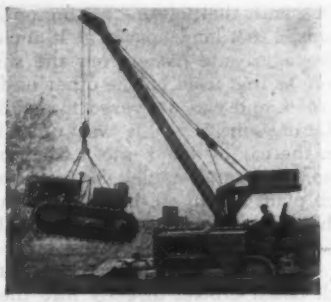
The Universal 822-Q Crushing and Screening Plant combines the high production of dual crusher units with extreme flexibility, in a compact, easy-to-move plant. Either unit can be used independently. The 800 Secondary Unit is adapted to use as a gravel plant.

This is part of the story—read the rest in Bulletin 30.

UNIVERSAL ENGINEERING CORP.
620 C Ave., West Cedar Rapids, Iowa

UNIVERSAL

ROCK AND GRAVEL CRUSHERS, CRUSHING ROLLS, HAMMER MILLS, COMPLETE CRUSHING AND SCREENING PLANTS, WASHING PLANTS, ASPHALT PLANTS, SPREADERROLLERS.



The new Roustabout tractor-mounted crane is designed for many loading, unloading, and material-handling jobs.

New Long-Boom Crane Has Tractor Mounting

A powerful new Roustabout crane for handling loads up to 10 tons has been announced by the Hughes-Keenan Co. Designed for loading, unloading, moving, or stacking heavy bulky objects, the new model MC-8 is a mobile tractor - mounted full - swing - boom crane.

Especially adapted for using long booms, the MC-8 will handle loads of nearly 2 tons at a 30-foot radius, and 10 tons at 9 feet. Booms of standard lengths, 15 to 30 feet, are furnished. The boom swing and hoist and load hoist are all independent actions on the new crane. Each has separate controls and automatic brakes. The ball-bearing boom turntable and all gears and clutches run fully enclosed in oil.

Further details on the new Model MC-8 crane may be secured by readers of CONTRACTORS AND ENGINEERS MONTHLY who mention this report when writing the Hughes-Keenan Co., 649 Newman St., Mansfield, Ohio.

Renewable Tractor Rims Discussed in New Bulletin

When tractor sprocket rims and idler wheel rims wear out today, they are not replaced by complete new rims, as heretofore, the Alloy Steel & Metals Co. says in a new brochure. Instead, the sound hubs and spokes can be saved and Pacific manganese renewable tractor rims welded onto them, effecting a saving in both metal and money. Pacific renewable rims are made of tough wear-resistant manganese steel, and are easily installed by an experienced welder.

Further details and a copy of the bulletin on Pacific rims may be secured by writing Alloy Steel & Metals Co., 1862 East 55th St., Los Angeles 11, Calif. Just mention this item.

Six Concrete Spans On 16-Mile Project

(*Continued from preceding page*)

yards of sand and 2 yards of gravel from the batching bins to the tower where they backed up a wooden ramp and unloaded into a hopper. The aggregate was weighed in a Blaw-Knox batcher and then dropped into the skip of a Jaeger 10-S 2-bag mixer, after which two sacks of cement were added. A similar mixer was held in reserve. Water for the concrete was pumped from the creek by a Deming 2-inch pump.

The weights of a typical batch were as follows:

Cement	188 lbs.
Sand	394 lbs.
Gravel	564 lbs

Twelve gallons of water was added to each batch which had a cement factor of 1.55 barrels per yard. After mixing 2½ minutes, the concrete was delivered to a bucket holding a complete batch and was hoisted to a hopper about 40 feet above the ground from where it was chuted by gravity into the forms. Vibrating was done with Mall and Marvel units. Each slab and girder span contains 39 cubic yards of concrete which took from 3½ to 4 hours to pour. Screeding was done by a 36-foot longitudinal truss screed manned by eight men who worked it back and forth over the 34-foot span. The concrete was cured with wet sand on top of the slab. Work was started in the spring of 1945 and completed by autumn.

Quantities and Personnel

The major estimated quantities on this contract were as follows:

Excavation	2,000 cu. yds.
Concrete	3,291 cu. yds.
Untreated-timber piling	2,500 lin. ft.
Reinforcing steel	745,669 lbs.
Structural steel	133,500 lbs.

J. A. Cooper was Superintendent for Forcum-James Co. which employed a force of twenty men on this construction, while O. C. Fewell was Project Engineer for the Alabama State Highway Department. G. W. Phillips is Construction and Maintenance Engineer of the State Highway Department and J. F. Tribble is Assistant Construction Engineer. John W. Chambers is State Bridge Engineer. The work was located in the Third Division, of which S. J. Cumming is Division Engineer.

Homelite Chicago Office

The reestablishment of offices in the Chicago area has been announced by the Homelite Corp., Port Chester, N. Y., manufacturer of portable pumps, generators, and blowers. The new unit will contain shop facilities for the complete servicing and repair of Homelite products, with factory-trained mechanics and a complete stock of parts on hand.

T. W. Gramm, former Manager of the firm's Philadelphia office and a Homelite technician with the armed services during the war, is to manage the new office, which will be located at 2409 Lake St., Melrose Park.

HEATING KETTLES
FOR ASPHALT AND TAR
Fire Proof—Oil Burning
Hand and Motor Driven Spray

Other Products
CONCRETE VIBRATORS
Gasoline Engine and Electric Motor Driven Models
FRONT END SHOVELS
for Industrial Tractors
AGGREGATE DRYERS
for Stone and Sand
ASPHALT PLANTS
Portable—Stationary
WRITE FOR CIRCULARS

White Mfg. Co.
ELKHART INDIANA

ACCO-LOC SAFETY SPLICE

The revolutionary ACCO-LOC Safety Splice makes hand-tuck splicing obsolete and unnecessary. Neat, compact, flexible to the terminal, it always develops 100% rope strength. It can be used with any standard fitting. Send today for literature.

ACCO-LOC Safety Splice offers many advantages, any one of which might easily justify its use.

1. It is safe. No wire ends to barb. It is easy to handle.
2. Does not distort the rope structure. Maintains equalized stresses in all strands.
3. It is neat, compact. Has no seizings to loosen and get in the way. Applies load stress in direct line with the pull of the load.
4. ACCO-LOC Safety Splice is extremely flexible—clear to the terminal, thus permitting close snubbing.
5. Easy to inspect at all times.
6. It may be used with any standard fitting (hook, ring, shackle, thimble, etc.). Upon retirement, fittings may be salvaged and re-used.
7. ACCO-LOC Safety Splice is made of preformed wire rope—the safe, kink-resisting, easy-to-handle type of wire rope.

Write or wire your nearest American Cable Division office.

ACCO
Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Bridgeport, Conn.

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

One of two models of Flink spreaders, this HD-4 is hydraulic-operated.

Material Spreaders In Two New Models

The elimination of wartime restrictions and the completion of three years of experimental work have permitted the Flink Co., manufacturer of self-feeding spreaders, to begin the production of two new models. The equipment is built for ice control, resurfacing, seal coating, and other work requiring the spreading of materials. Designed primarily for applying sand, cinders, and chemicals to icy pavements at traffic speed, the spreaders can also be used with buckshot, pea gravel, chips, or chat up to 1 inch in size.

Serving as replacemen's for the tailgates of dump trucks, the Flink self-feeding spreaders can be put in place in less than 10 minutes. Operation of the device is controlled by the driver from the cab. The width of the spread can be varied from slightly more than that of the truck to the width of an average highway. Equipped with a sand-chip attachment, the spreader can put a ribbon of material right up to the curb, and give an even surface at corners or intersections.

New Model WD-31 is powered by a chain drive from a sprocket on the left rear wheel of the truck. Contained within the spreader, and controlled from the cab, is a precision clutch, made by the Dodge Mfg. Corp. The self-feeder can be put into operation or cut out at will, without slowing down or interfering with traffic.

Similar to the WD-31, but operated hydraulically, is the new HD-4. In this the power take-off sprocket is replaced by a hydraulic pump and motor, eliminating all projecting parts. The pump does not interfere with the dump-box hoist. Operating in traffic up to 30 mph, the spreader may be used at will and the width of the spread increased without increasing the truck speed.

Built for hard use, both models are electrically welded throughout. They are equipped with steel sprockets and roller chain, guarded by steel plates, on the right-hand side. Hyatt bearings are used in the entire mechanism.

While production of the WD-31 and HD-4 is at present limited, the firm is enlarging its plant to provide a trebled rate of manufacturing within six months. Full details on the two new spreaders may be secured direct from the Flink Co., Dept. 4, Streator, Ill.

Runway Contact Light Carries Large Loads

Designed to carry the loads imposed by today's heavy-weight airplanes, a new contact light for airport runways has been announced by the Westinghouse Electric Corp. The unit is interchangeable with Army and Navy standard contact-light mounting dimensions. It is a foot in diameter and projects only 2¾ inches above ground.

Made to give higher light output, the new contact light meets all Army, Navy, and CAA requirements. It will bear a dead load of more than 50 tons, equivalent to that imposed by a 200,000-pound plane taxiing over it during take-off or landing. A cantilever-type frame made of new high-strength alloy steels carries the load. The lens floats on synthetic-rubber gaskets, and has high transmission value. Although heated to withstand tremendous impacts, should breakage occur, it flies into thousands of small pieces to minimize the danger to tires.

Further information may be secured from the Westinghouse Electric Corp., Box 868, Pittsburgh, Pa.

Instrument Firm Works To Beat Stock Scarcity

"At the present time we are in a position where we have a very fine catalog but few instruments for immediate delivery," the Warren-Knight Co. says, announcing that it is engaged in building up a stockpile to take care of its backlog of orders for engineering and surveying instruments and accessories.

The firm manufactures Sterling transits and levels, various field equipment and supplies, and drafting-room materials. It expects to be able to handle orders for most models within a few months.

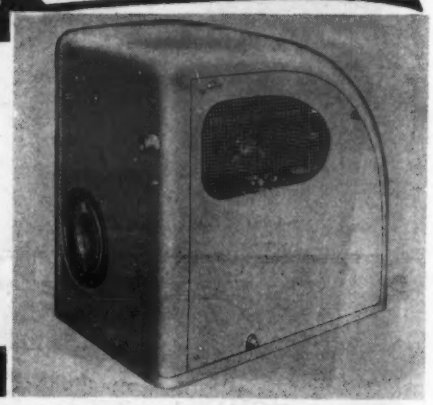
An attractive 56-page catalog is available to readers of CONTRACTORS AND ENGINEERS MONTHLY who are engaged in planning their equipment needs for the construction program ahead. Mention this item when writing the Warren-Knight Co., 136 North 12th St., Philadelphia, Pa.

WINPOWER ELECTRIC PLANTS

for Every Contractor's Needs; More Power, Less Cost

Get these *extra* WinPower advantages on *your* construction jobs. Heavy-duty gas engines for bigger output, oversize bearings and parts, compact for easy portability, complete enclosed units for all weather, very low operating cost. Sizes from 350 watts to 35,000 watts. Send for illustrated catalog today.

WINPOWER MFG. CO. NEWTON, IOWA



STRONGEST* OF THEM ALL IS

Caine Corr-Plate Steel Piling Used In Garage Foundation Construction

*YES, PER POUND WEIGHT *it's the champ* in its weight class !

AVAILABLE IN ANY LENGTHS

Used the world over for building Foundations, Dams, Retaining Walls, Docks, Levees, Bulkheads, and thousands of other construction jobs, Sewers and Disposal Plants.

Investigate NOW

these and many other time-proven reasons why THOUSANDS OF ENGINEERS AND CONTRACTORS SWEAR BY "CAINE CORR-PLATE"

1. Easier to transport. (Nestable)
2. Easier to handle and set.
3. Easier to drive.
4. Easier to pull without distortion.
5. Easier to use over and over again.
6. Easier to set under existing structures.

Write for FREE Catalog

Surprising is the strength you'll find in Caine Corr-Plate. Its performance time after time has amazed even its most enthusiastic users! *"You wouldn't think it had so much strength to look at it, BUT . . ."* that's what the men on the job say . . .

The answer is in the EXCLUSIVE CAINE CORRUGATING METHOD. No other steel piling has the strength per pound weight which is imparted to steel when it is rolled like Caine Corr-Plate. The secret is in the perfect uniformity of the corrugations, giving the sheet uniform strength throughout.

Don't overlook Corr-Plate. Consider its MANY ADVANTAGES when figuring ANY JOB . . . because there are thousands of jobs that ought to go Corr-Plate. . . . but don't . . . just because someone didn't investigate!

CAINE Steel Company
STEEL PILING DIVISION
1820 N. Central Avenue
CHICAGO 39, ILLINOIS

1351

BATCHING. For the eastern section of the Alva B. Adams Tunnel, part of the Bureau of Reclamation's Colorado-Big Thompson Project, S. S. Magoffin Co. set up a Blaw-Knox batching plant (above) about 1,000 feet from the tunnel portal. After this photo was taken, the plant was enclosed in a wooden structure to protect the aggregate bins from the weather. At the west end of the project, (right) a C. S. Johnson batching plant was set up over the tunnel portal by Stiers Bros. Construction Co., with the cement bin in the middle.

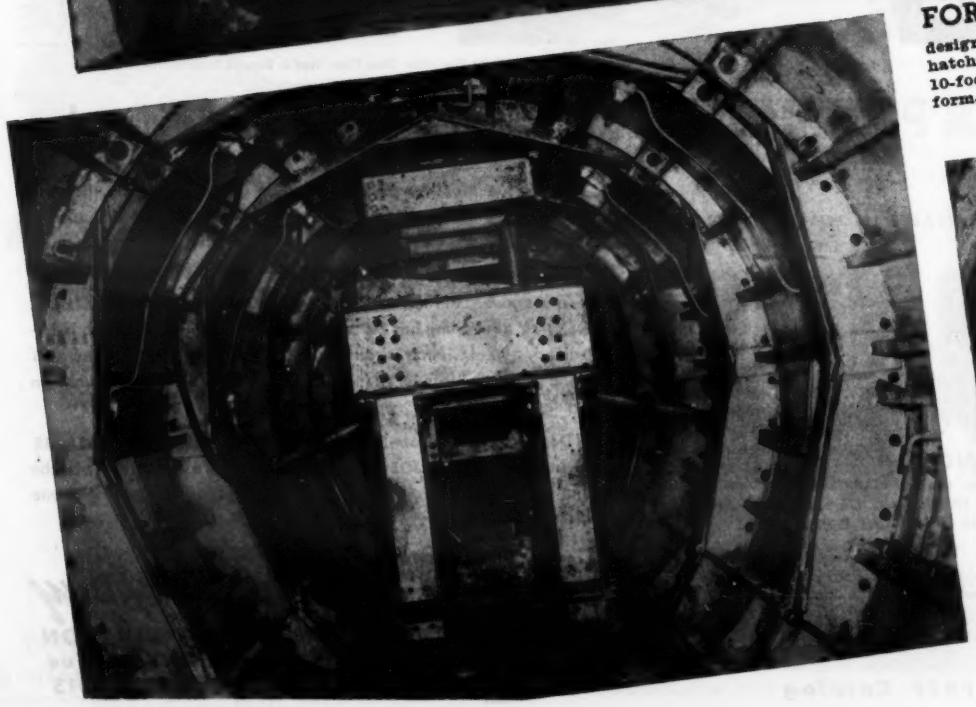
Concrete-Lining Methods On Long Diversion Tunn

Invert Is Completed and A And Side-Wall Concreting Und On Alva B. Adams Tunnel to Water Through Continental

Bureau of Reclamation Photos

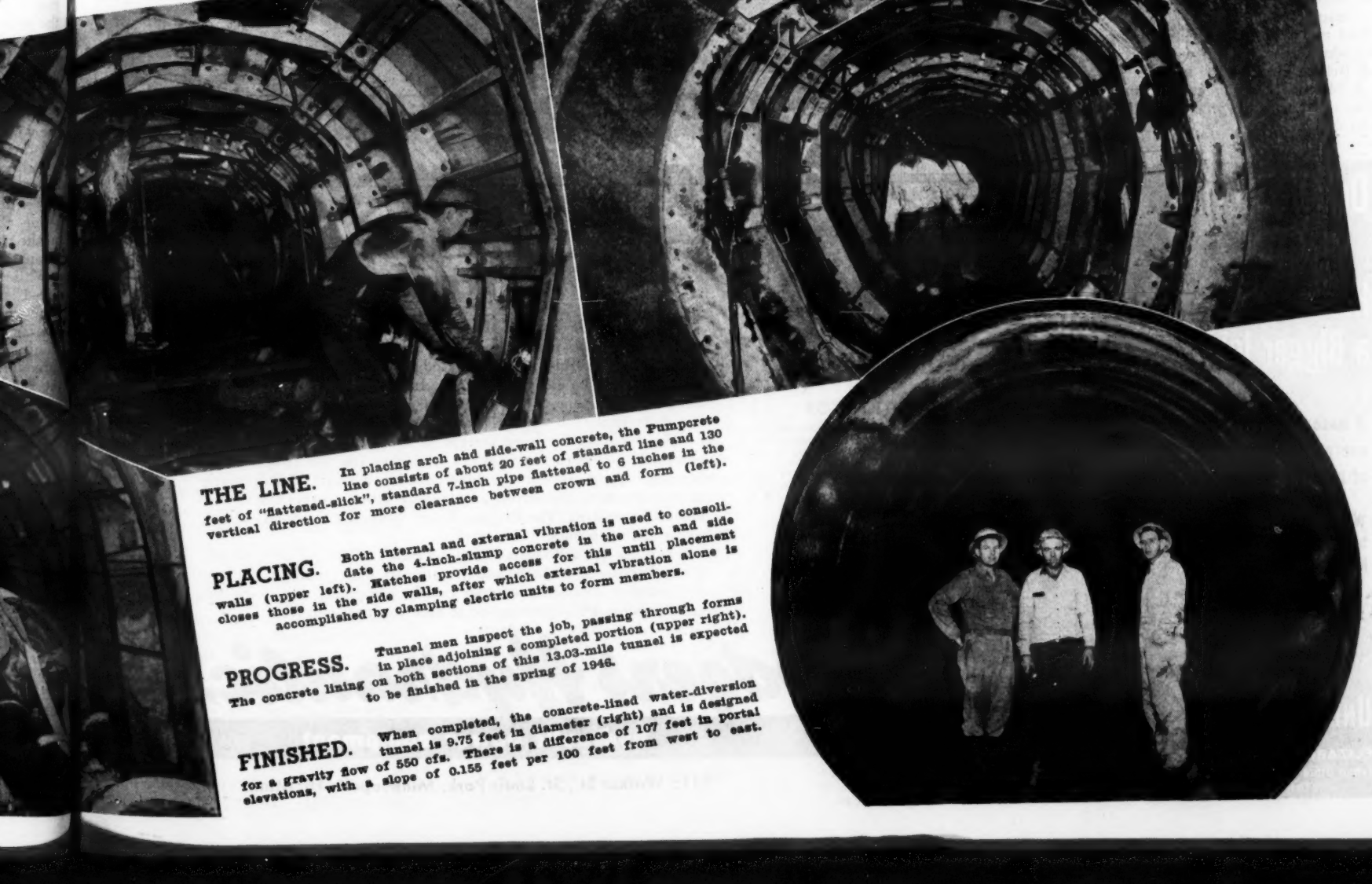
(See article on page 2)

INVERT. On the west end, suspended from the tunnel roof, the Pumpcrete line, delivered the concrete to a movable chute which deposited it in the invert forms, as shown at the left. On the other end, the line, supported by tripods on the floor, delivered direct to the forms.



FORMS. The arch and side-wall forms for the Alva B. Adams Tunnel were designed and fabricated by Blaw-Knox and have hatchways at 5-foot centers in the crown and at 10-foot centers in the side wall. At the left, the form-shifting traveler or jumbo is shown in place, ready for stripping the forms.

"THE STRING." Unloading, handling, mixing, and placing equipment for the Alva B. Adams Tunnel was specially designed for the job and is the same on both contracts. The first unit in "the string", which is mounted on industrial-railway trucks to run on the 24-gage tunnel track, is an inclined track leading to the unloading hopper, shown at the upper left with a C. S. Card batch car. A Barber-Greene conveyor 33 feet long transfers the material from the unloading hopper to a 1-cubic-yard transfer hopper (upper right). From the transfer hopper the dry batch is moved by the mixer conveyor, another B-G, to the 1-cubic-yard mixer (lower left) which discharges to another conveyor leading to the Pumpcrete. The next step is the re-mixing drum of the Model 200 Pumpcrete (lower right).



THE LINE. In placing arch and side-wall concrete, the Pumpcrete line consists of about 20 feet of standard line and 130 feet of "flattened-slick", standard 7-inch pipe flattened to 6 inches in the vertical direction for more clearance between crown and form (left).

PLACING. Both internal and external vibration is used to consolidate the 4-inch-slump concrete in the arch and side walls (upper left). Hatches provide access for this until placement closes those in the side walls, after which external vibration alone is accomplished by clamping electric units to form members.

PROGRESS. Tunnel men inspect the job, passing through forms in place adjoining a completed portion (upper right). The concrete lining on both sections of this 13.03-mile tunnel is expected to be finished in the spring of 1946.

FINISHED. When completed, the concrete-lined water-diversion tunnel is 9.75 feet in diameter (right) and is designed for a gravity flow of 550 cfs. There is a difference of 107 feet in portal elevations, with a slope of 0.155 feet per 100 feet from west to east.

Wooden Expansion Joints Used Without Usual Dowels

Concrete Sills Beneath Wood Joints Made in the Field Used to Transfer Slab Loads in New Jersey

By WILLIAM H. QUIRK,
Eastern Field Editor

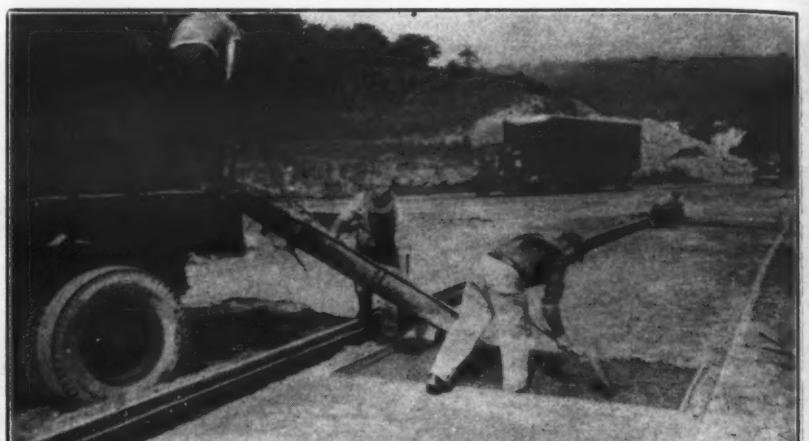
✦ A NEW method of transferring the moving loads passing from slab to slab along a concrete pavement has been used in the recently completed dual highway at the New Jersey approach to the Delaware River Toll Bridge which connects Easton, Pa., and Phillipsburg, N. J. This unusual design of the New Jersey State Highway Department eliminates steel dowels, which for many a year have been placed through expansion joints for load-transfer purposes, and employs instead the construction in the sub-base of a concrete sill, extending on either side beneath a wooden expansion joint, in order to furnish support for the abutting slabs at the point where most trouble in concrete pavement develops.

Both grading and paving of the new 1.6-mile road were done by Fred Berlanti & Son, Inc., of Harrison, N. Y., which started grading operations in October, 1944, (see C. & E. M., February, 1945, page 39) and began paving near the end of June, 1945. The existing 8-inch reinforced-concrete pavement, 20 feet wide, was widened by adding a 2-foot strip and a 10-foot concrete lane of the same thickness, and the entire 32 feet was paved with a 2½-inch surface of bituminous concrete. The other half of the dual highway is all new construction, consisting of three 10-foot lanes of 10-inch reinforced concrete with a 2-foot gutter section. All new concrete pavement was built on a 12-inch sand and gravel sub-base.

East and westbound traffic is separated along most of the way, from the Toll Bridge Plaza to the intersection of N. J. 24 with the connection from N. J. 28, by a parkway varying in width from 16 to 200 feet.

Laying Sub-Base

A suitable source of granular sub-base material was found in a borrow pit at Springtown, N. J., about 6 miles to the south, where a Northwest 1½-yard shovel loaded 10 trucks, 4 Fords, 3 Internationals, and 3 Macks, which hauled an average of 8 tons of material on each trip. The gravelly soil was end-dumped on the grade and spread roughly by an Allis-Chalmers HD-10 tractor with dozer, and then finished off by an Adams power grader. The material was laid in two courses and, in addition to the compaction gained from the equipment continually working upon it, the sub-base was also rolled by a Buffalo-Springfield 10-ton 3-wheel roller.



C. & E. M. Photo
Concrete for the 4-inch-deep sills on which rest the wood expansion joints in a recent New Jersey concrete paving job was delivered by a Jaeger truck-mixer and spread and finished by hand.

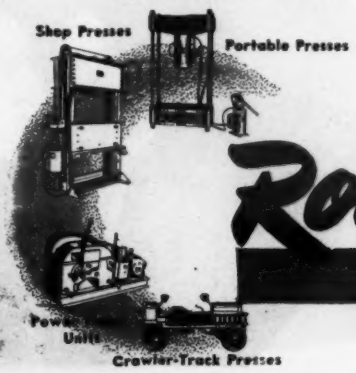
To insure that the material used was of uniform quality, three samples were taken every day from loaded trucks and

(Continued on next page)

Rodgers crawler track Presses

MR. CONTRACTOR . . .

Your dealer probably has Rodgers Track Servicing Presses in his service department for the purpose of helping you maintain your equipment. If he hasn't and your requirements won't justify your having a Rodgers Press of your own, urge him to investigate the savings of a Rodgers. It will pay you both!

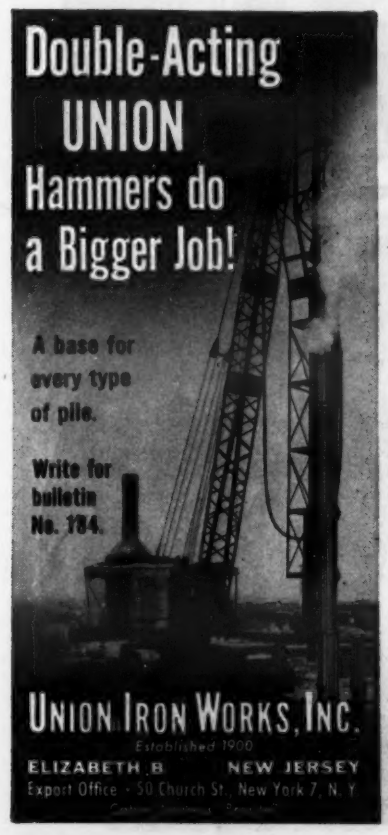


It's a waste of time to lay up crawler-tractors a couple of days for routine track maintenance—it's unnecessary to slug the pins and tug or burn stubborn nuts. A Rodgers Track Press does the track service job . . . so easily . . . so fast. It takes just an average 3 or 4 hours machine time to service two large strings of track—and you can do it on the job with a *Portable Rodgers*.

An exclusive Rodgers feature is the Retractable Jaw which eliminates lifting the track over a stationary jaw and assures proper bearing support against the inner side of the rail, thus properly spacing the rails, eliminating any binding action—leaves tracks flexible after servicing. The Rodgers Track Wrench is the handy answer to tight, frozen nuts.

You can get a Rodgers Crawler-Track Press in portable models: 2 wheel trailer or 4 wheels; and in stationary shop models. *Write now* for complete details; or see your crawler equipment dealer—he will tell you what a Rodgers can do to save you time and labor.

Rodgers Hydraulic, Inc.
hydraulic power equipment
7415 Walker St., St. Louis Park, Minneapolis 16, Minn.


Double-Acting
UNION
Hammers do
a Bigger Job!
A base for every type of pile.
Write for bulletin No. 184.
UNION IRON WORKS, INC.
Established 1900
ELIZABETH 8 NEW JERSEY
Export Office - 50 Church St., New York 7, N. Y.

Wooden Joints Used Without Usual Dowels

(*Continued from preceding page*)

tested in a field laboratory, and if any of these specimens fell short of the specifications, excavation from the part of the pit where that particular material was obtained was abandoned. The gradation limits of the sub-base material, which were fairly elastic, together with a sieve analysis of a typical specimen were as follows:

Retained on Square Sieve	Per Cent Specification Limits	Typical Sample
4-inch	0	0
½-inch	10-65	26
¼-inch	10-75	39
No. 50	70 or over	86

Setting Forms

In addition to the four equipment operators and the ten truck drivers used in laying the sub-base, three or four men were used on the road to spot the trucks for dumping, to check the required 12-inch thickness, and make any corrections before the forms were brought in. A crew of eight was used on the forms, with five men setting the 10-inch Blaw-Knox steel forms and three more removing them after the preceding day's pour. About 2,000 feet of forms were available on the job, with at least 600 feet always ahead of the paver.

Since neither longitudinal nor transverse dowels were used on this job, the longitudinal key for adjoining slabs was formed by fastening a wooden block lengthwise along the form. The top of this ½ x 2½-inch block was set 3½ inches below the top of the form, and secured to it by 3/16-inch bolts spaced 17 inches on centers to form a tongue-and-groove keyway.

After the forms were set by hand 10 feet apart, the sub-base material was fine-graded by rolling a Cleveland four-wheel scratch template over the forms, while a crew of four men either removed surplus material or added some by hand where it was needed. The grade was then rolled by a Fordson 5-ton 3-wheel steel roller, and the forms were oiled with a long-handled brush.

Concrete Sills

The new departure by the New Jersey State Highway Department in eliminating steel dowels at the expansion joints and using a concrete sill for load transfer is an interesting experiment in concrete highway construction in this country. From investigation and research, including the tearing apart of concrete pavements at joints where considerable cracking had occurred, New Jersey highway engineers had discovered that dowels rust considerably despite their being embedded in half the depth of the slab and covered with coats of paint and oil. (See C. & E. M., June, 1945, page 65.) The corrosion and rust on the dowels prevent their sliding in the sleeves so that no contraction or expansion can take place, with the inevitable result of cracks appearing in the pavement. The use of the concrete sills is expected to overcome such cracking.

The 4-inch-deep sills of plain concrete are 8½ feet wide, extending to within 9 inches of the forms on each side, and are 5 feet long or 2½ feet on each side of the expansion joints which are 56 feet 4 inches apart; the slab is built with no contraction or dummy joints. The sills are embedded 3 inches in the subgrade so that they project 1 inch into the concrete slab. A couple of men with hand shovels made the slight cut in the sub-base, hand-tamped it, and set the sill forms which were plain wood strips, ¾ x 4 inches, anchoring them in place at each corner with a steel form pin until after the concrete was poured. The wooden forms were not removed.

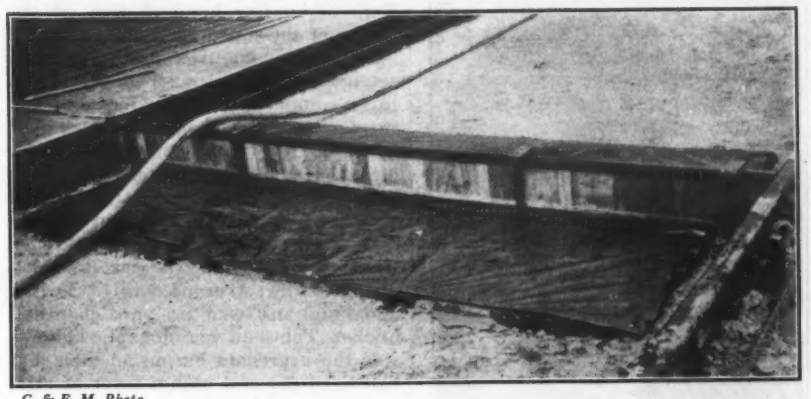
Truck-Mixer Used

Pouring of the sills was done from a Jaeger truck-mixer mounted on a Mack truck owned by the Steckel Sand Co. which supplied the class B concrete used. Mixing time averaged five minutes for the ½-mile haul from the Steckel batch plant in Phillipsburg before the concrete was chuted into the forms and spread by two men with shovels, who then screeded it with a 2 x 8-inch plank 8 feet long, and put a trowel finish on the surface.

The truck-mixer carried an 8-bag batch of 1:1.67:3.5 concrete in the following proportions by weight:

Cement	752 lbs.
Sand	1,330 lbs.
Gravel, ¾-inch	2,626 lbs.

The concrete was then covered with 90-pound Sisalkraft paper pulled tightly over the sill and fastened to the wooden forms with roofing nails, after which the paper was coated with the same type of oil used on the road forms, to prevent any moisture from the joint seeping through the concrete sill to the sub-base. Along the 5-foot sides of the forms, which projected 1 inch out of the sub-base, a ½ x 1-inch cellulose strip was then nailed to act as an expansion joint for any lateral movement.



C. & E. M. Photo

New Jersey highway engineers believe that this new type of expansion joint, consisting of red hardwood cypress 1⅛ inches thick and 8 inches deep, installed on concrete sills in the subgrade at intervals of 56 feet 4 inches, will prevent pavement cracking at these points.

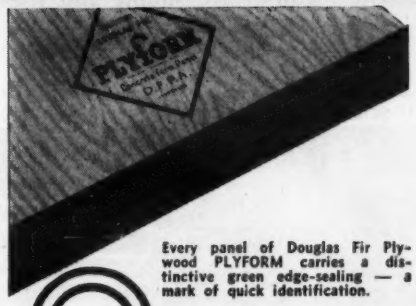
While the concrete was still fresh, a carpenter set a wooden template across the sill at the location of the expansion joint which was to go between the

(*Continued on next page*)

Douglas fir plywood PLYFORM concrete forms helped give a smooth, attractive, streamlined finish to this beautiful City Hall in Santa Monica, California. Architect was Joe Estep.

For Superior Performance in Concrete Forms - *specify*

PLYFORM



Every panel of Douglas Fir Plywood PLYFORM carries a distinctive green edge-sealing — a mark of quick identification.

PLYFORM is a specialized grade of Douglas fir plywood manufactured to meet the particular needs of concrete form work. Highly water-resistant glues and cross-laminated construction give every panel a combination of strength and toughness. PLYFORM will support a load of 500 pounds per square inch on a ⅝" panel with joists 12" apart (deflection is less than 4/100" of an inch)—and as many as 15 reuses have been reported. Consider the other advantages* too, and you'll see why PLYFORM **does** give superior performance.

GENUINE DOUGLAS FIR PLYFORM TRADE MARK REG. U. S. PAT. OFF. Concrete Form Panel D. F. P. A. INSPECTED

This "grade trade-mark" appears on the face of every genuine panel of Douglas fir plywood PLYFORM.

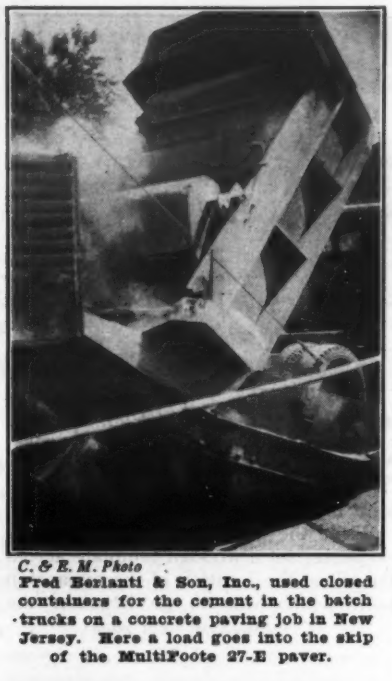
*** PLYFORM REDUCES CONSTRUCTION COSTS!**

Large, rigid panels of PLYFORM—4 x 8 feet in size, and from ½" to ¾" thick—go up quickly and easily. PLYFORM is readily worked either by hand or with power tools. Stripping is fast and simple. Joints and fins are minimized. Leakage is reduced and finishing costs are lessened because the sanded surfaces of PLYFORM panels give the concrete face a smooth, even appearance.

Technical information is contained in a booklet "Concrete Forms of Douglas Fir Plywood" — and Association engineers will be glad to work with you in solving particular problems.

Douglas Fir Plywood Association
Tacoma 2, Washington

For prices or delivery information see any lumber dealer in the United States. Every dealer will soon have plywood in stock.



C. & E. M. Photo
Fred Berlanti & Son, Inc., used closed containers for the cement in the batch trucks on a concrete paving job in New Jersey. Here a load goes into the skip of the MultiFoote 27-E paver.

Wooden Joints Used Without Usual Dowels

(Continued from preceding page)

slabs, and drove four pins through guide holes, two into the concrete and one each into the sub-base at each end of the sill, to support the joint when it was placed on top of the sill. The pins driven through the concrete were then pulled out and in the holes that they left was placed a metal sleeve, 4 inches long x 1 inch in diameter, through which the regular joint-supporting pins were later driven. The sleeves were used as a precaution against the concrete in the sill setting up too hard before the wooden expansion joints were installed.

Wooden Expansion Joints

Another innovation in this paving design is the use of wooden expansion joints, 1⅛ inches thick, 8 inches deep, with the top set ¾ inch below the top of the slab. The joints were fabricated on the job by two carpenters from pieces of red hardwood cypress between 4 and 12 inches in width. A Sears Roebuck power saw and sander were used to cut and finish the strips, which were placed with the grain direction vertical and joined together by ½-inch corrugated-metal fasteners driven into both the bottom and top. A sealing strip was also added at the bottom, consisting of a 1-inch wooden chamfer strip, first glued and then nailed along each side.

A 10-gage sheet-metal protection cap, with a 2-inch leg on each side, fitted over the top of the wood joint to prevent any damage during the screeding and finishing operations. To keep the joint upright while the concrete was being placed, four steel pins, 18 inches long x 1 inch in diameter, were inserted in the ground on the side towards the direction of the pour. The tops of these pins were welded to a metal strip, 2 x ⅜ x 2⅝ inches long, which in turn was welded to the top of the protection cap. The pins were slipped into the previously driven guide holes, two in the ground and two with the metal sleeves in the concrete sill.

Two men prepared the joints, and the contractor usually had six sills and joints in readiness before any concrete was poured in the slab. The sill concrete also had to be strong enough to walk on before any work could be done on the pavement.

Batching Plant

A plant to supply batches for the concrete paving was set up on a siding of the Delaware, Lackawanna & Western Railroad, a few hundred feet off the center of the job so that the maximum haul was only about ¾ mile. Here was set up a Blaw-Knox 100-ton bin with three compartments, one for sand and two for the different sizes of gravel used in the mix.

Sand was purchased from the Hodgson Sand & Gravel Co. and shipped via the D. L. & W. 30 miles in gondola cars from the plant at Netcong, N. J., to the siding, where it was unloaded by a Northwest crane with a 50-foot boom and an Owen 1½-yard clamshell bucket. The sand was stockpiled alongside the aggregate bin on an area that had been covered with a layer of railroad ties so that the clamshell would not pick up any dirt when it was loading the bin. The sand was confined within an enclosure formed of seven tiers of railroad ties laid one on top of the other.

Gravel from the nearby Delaware River was used as the coarse aggregate, and was purchased from the Portland Sand & Gravel Co. which delivered the material to the batch plant in its own trucks after a 7-mile haul from Carpentersville, N. J. The trucks backed up a ramp and end-dumped the material into an enclosure similar to that used for the sand, but located on the other side of the aggregate bin. The crane which kept the bin full of material moved back and forth between the

(Continued on next page)

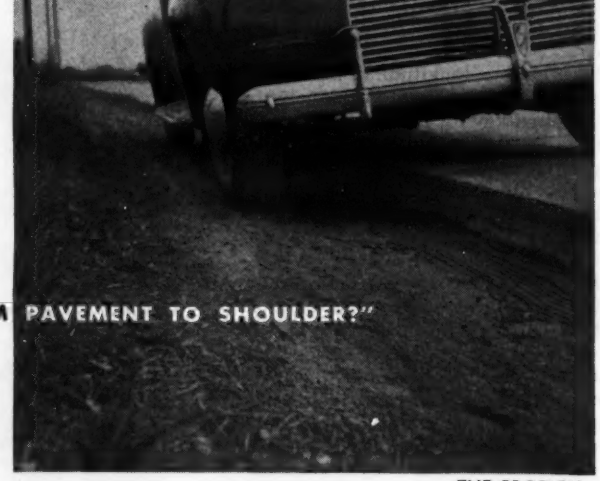
A TOUGH ROLLER FOR TOUGH JOBS

Pierce-Bear 3½-5 Tons Variable Weights

Engineered for economical operation where the going is tough. Compact, easy to operate. Rear roller gives heavy duty compression. Built-in water tanks for wet rolling. Powered with Allis-Chalmers Industrial Heavy-duty Model "B" gasoline engine. Write for details.

Manufactured by
H. W. LEWIS EQUIPMENT COMPANY
415-431 Hoefgen Ave., SAN ANTONIO 6, TEXAS Phone Garfield 6137 or 8931

"Are any of your roads too narrow?



THE PROBLEM

. . . OR HAVE THEY DANGEROUS DROPS FROM PAVEMENT TO SHOULDER?"

Roads too narrow to carry today's fast-moving traffic safely and satisfactorily may be swiftly and economically widened with Tarvia* or Tarvia-lithic.*

The methods are simple and inexpensive, and there are combinations of Tarvia and aggregate which are adaptable to any kind of road and any condition of shoulder areas.

THE SOLUTION

Dangerous drops between pavement and unfinished shoulder are done away with, and the widening not only extends the life of the road but also increases the amount of traffic it can safely accommodate.

Why not check the narrow roads in your locality? The Tarvia field man can advise the proper shoulder foundations and wearing surfaces, and he will be glad to work with you.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N.Y.

New York • Chicago • Birmingham • St. Louis • Detroit • Philadelphia • Boston
Rochester • Minneapolis • Cleveland • Columbus • Toledo • Youngstown • Syracuse
Buffalo • Cincinnati • Bethlehem • Portland, Me. • Bangor, Me. • Norwood, N. Y.
Oneonta, N. Y. • Elmira, N. Y. • Cromwell, Conn. • Norwich, Conn. • Savannah, Ga.
In Canada: THE BARRETT CO., LTD. Montreal • Toronto • Winnipeg • Vancouver

Barrett Tarvia*
*Reg. U. S. Pat. Off.

Wooden Joints Used Without Usual Dowels

(*Continued from preceding page*)

two stockpiles on a mat of railroad ties.

The Highway Department also experimented for the first time with air-entraining cement, which they hope will stop the scaling of concrete pavements. The cement was bought in bulk from the Penn-Dixie Cement Corp. plant at Nazareth, Pa., and shipped 10 miles in cement cars via the D. L. & W. to the batch plant. About 100 yards from the aggregate bin a C. S. Johnson 100-barrel cement bin was erected into which the cement was loaded after it had dropped from the car into a trough between the tracks, and then moved by a worm gear to an enclosed bucket elevator run by a Le Roi engine, which lifted it to the storage bin.

Eight Ford trucks, of two-batch capacity each, hauled the batches to the paver after first backing under the aggregate bin to receive the sand and gravel which was weighed on a beam scale, and then pulling under the other bin for the cement which was weighed by a Johnson batcher. The cement bin was equipped with an air compressor which loosened and dislodged the cement from the metal sides and speeded the loading of the trucks. The batch trucks were outfitted with special closed containers for the cement so that none could be lost in transit to the paver. These containers open only when the batch is being dumped into the skip of the paver.

Batch Proportions

The gradations of the two sizes of gravel and the sand used in the mix were as follows:

Screen Size	Per Cent Passing 1½-inch Gravel	Per Cent Passing ¾-inch Gravel	Per Cent Retained Sand
2½-inch	100	....	....
1½-inch	10-30	100	....
¾-inch	0-5	45-75	....
½-inch	....	25-45	....
¼-inch	....	0-10	....
No. 10	....	....	0-20
No. 30	....	....	20-60
No. 50	....	....	20-50
No. 50(passing)	....	....	12-25

The actual weights of the 7-bag batch used were:

Cement	658 lbs.
Sand	1,068 lbs.
Gravel, 1½-inch	993 lbs.
Gravel, ¾-inch	1,504 lbs.
Total	4,223 lbs.

Paving Operations

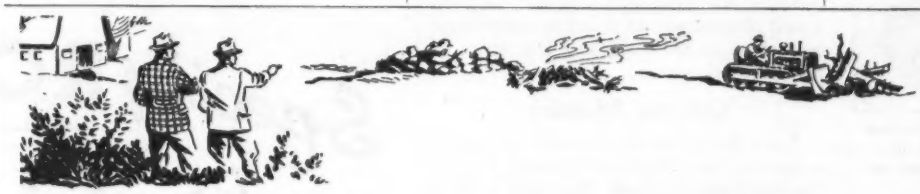
The batches were emptied into the skip of a MultiFoote single-drum 27-E paver with a 27-foot boom and a single-gate discharge bucket working on the grade alongside the lane being poured. Water for the concrete was tapped from Phillipsburg fire hydrants, and brought to the paver in a 2½-inch iron pipe that had a maximum length of 1,000 feet. After being mixed 1¾ minutes, the batch of concrete was spread on the grade and finished by a Blaw-Knox double-screed gas-electric finisher, with three puddlers working in the pit directly ahead of it. Along the sides of the slab the concrete was vibrated by a Mall vibrator handled by one man who pushed it along on a wheelbarrow-like arrangement consisting of a rubber-tired wheel and two long pipe handles.

Underneath the discharge chute on the paver was a 4 x 4-foot wooden platform to catch any grout before it was lost on the ground. One man was used to replace this material in the bucket and also to pull ahead the rubber hose which connected the water-supply line to the tank on the paver. Working ahead of the paver was a laborer who kept the sub-base wet when necessary, and also oiled the forms. Another man was assigned to the unloading of the batch trucks and to hit the bottom of the skip with a sledge hammer when it was raised to make sure that all the cement went into the drum.

The concrete was first struck off to a depth of 2 inches below the top of the slab to receive the steel mesh reinforcement which was placed by two men working outside the forms. These two then tamped the mat down into the concrete with a tool resembling a screed, having a section extending 2 inches below the top of the forms and with a plow handle at each side. This prevented the mesh from being pushed further into the concrete than was intended. The welded steel mat consisted of sixteen ⅜-inch-diameter bars, spaced 7½ inches center to center across the 10-foot slab, and six bars spaced at 27 inches on centers along the longitudinal axis of the road. The mats were lapped 15 inches.

The steel was then covered with 2 inches of concrete which was given a double screeding, about five minutes apart, to make up for the absence of a longitudinal finisher which the contractor had not been able to purchase since he did not have a sufficiently high

(*Concluded on next page, Col. 2*)



Clear Land at Lower Cost —Increase Tractor Income!

PACIFIC NORTHWEST land clearing costs have actually been cut from 50 to 75 per cent by Isaacson Klearing Blades. This may seem like an over statement, but the fact remains they are doing it for others and will do it for you.

First developed as a means of making logged-off stump land usable, these blades have since been adopted by many users for removing quickly and easily, trees, brush, stumps, roots and rock. These users particularly admire the way they comb out roots and other obstructions to a depth of 21 inches below the ground top, leaving the valuable top soil intact, ready for plowing. They like, too, the manner in which the blade piles the material, dirt free, ready for burning.

The specially designed teeth, adjustable to three positions, are shaped for maximum penetration and lifting power. The blade fits into the positions of your regular blade in a few minutes.

Available now for your Isaacson cable or hydraulic operated Trac-Dozer. See your dealer today, or write for complete details —prove to yourself you can cut YOUR clearing costs.

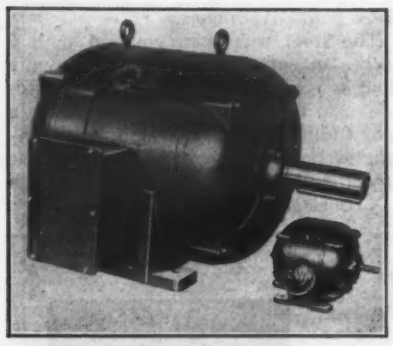
ISAACSON

Tractor Equipment

A PRODUCT OF THE ISAACSON IRON WORKS • SEATTLE

The OWEN BUCKET Co. 6030 BREAKWATER AVE., CLEVELAND, OHIO

BRANCHES: NEW YORK, PHILADELPHIA, CHICAGO, BERKELEY, CALIF.



Crocker-Wheeler protected-type motors are available in a wide range of sizes from the B58 to the 203, smallest in the line.

Electric Motor Line Has Three New Models

A complete line of ac squirrel-cage motors of the protected type, ranging from 1 to 200 hp, is now offered by the Crocker-Wheeler Division of the Joshua Hendy Iron Works, Ampere, N. J., with the addition of three new frame sizes.

Rated at 40-degree C rise, full-load continuous duty, with a 15 per cent service factor, the motors provide full protection against dripping liquids, falling metal chips, and other foreign matter. Sizes built in NEMA standard frames 203 to 326, inclusive, have no openings in the frame or shield above the horizontal center line. The three new sizes, B58-A, B, and C, and NEMA standardized 326 to 505, have basically the same construction, with two shielded air-exhaust openings added to the upper half of the frame.

Sizes 203 to 404 employ Alucast rotors, in which the bars, fans, and end rings are cast in one operation from aluminum alloys. Rotors in the larger sizes have copper bars with brazed-on fans and end rings. Stator coils in all models are protected by Vinylastic insulation. The firm's patented centrifugal bearing seal, used in all ball-bearing machines, permits the use of softer lubrication grease.

Further information on these motors may be secured direct from the manufacturer by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

Hammond of Gar Wood Made Vice Pres. of Sales

W. H. Hammond has been named to the newly created position of Vice President in Charge of Sales by Gar Wood Industries, Inc., Detroit. He had been serving as Sales Manager of the Hoist & Body and Tank Divisions, and as Director of Branches, with the title of Vice President. Associated with Gar Wood since 1921, Mr. Hammond has been Manager at the Baltimore, Boston, and New York offices. In his new post, he will supervise the sales activities of the Winch & Crane, Road Machinery, Heating, and Boat Divisions, in addition to those already under his charge, and will continue as Director of Branches.

PRECISION AIRCRAFT ENGINE PARTS
COMMERCIAL HEAT TREATING
SEASONING OF STEEL
NITRIDING—A SPECIALTY

CADMIUM, ZINC, TIN and HARD CHROME PLATING

GRINDING

DESIGN—MANUFACTURE UNIVERSAL JOINTS

Metallurgical Laboratories
ENGINEERING DIVISION

AGERSTRAND CORPORATION
Muskegon, Michigan
Sales Office: 1402 Kales Bldg. Detroit 26, Mich.

Wooden Joints Used Without Usual Dowels

(Continued from preceding page)

priority. In using the double-screed finisher one man was assigned to keep a roll of concrete in front of the second screed so as to avoid any low spots in the finished surface.

Concrete Finishing

After the concrete was well screeded, a crew of four finishers followed behind the machine to check the work with a 10-foot straight-edge, and to remove any rough spots with a 4-foot float, after which the surface was again checked with the straight-edge. A 2-foot strip of burlap, longer than the width of the slab, was next dragged along the top of the concrete to remove any laitance.

The finishers also removed the steel cap and pins from the wooden expansion joint after the finishing machine had passed over, and then screwed to the top of the joint a 1 x 1½-inch strip of wood, fastening it with 2½-inch (No. 10) wood screws spaced 18 inches on centers. This strip projected about ¾ inch above the top of the pavement and was left on until the joint was ready to be poured with bituminous mastic, which was also used in the small longitudinal crack formed by the edging tool between slabs. The wooden strip was leveled off for a foot back from the edge when an adjacent lane was being poured so as not to interfere with the finishing machine.

A special 6-foot float with a deep notch at the center to clear this projecting strip was used for a final grooming at the joints, after which a fiber broom was pulled lightly over the surface, while the joints were edged with a ¼-inch-radius tool. Curing was done by the Hunt Process, with the compound carried in a 25-gallon tank mounted on a 3-rubber-tired-wheel chassis; a Briggs & Stratton gas engine furnished the power to pump the liquid through a 30-foot rubber hose with a nozzle at the end.

Quantities and Personnel

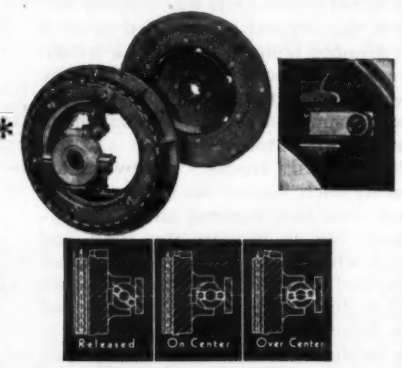
The cost of the entire 1.6-mile dual highway, including two bridges, about 112,000 cubic yards of rock and earth excavation, and the paving, was $699,047. The major items in the concreting included:

Bank-run gravel sub-base	18,000 cu. yds.
Concrete pavement	60,000 sq. yds.
Bituminous concrete surface	2,583 tons

The contract was awarded by the New Jersey State Highway Department, Spencer Miller Jr., Commissioner, and C. F. Bedwell, Acting State Highway Engineer, to Fred Berlanti & Son, Inc., Harrison, N. Y., for whom John Dugan was Superintendent. On this project, which was under the direction of H. D. Robbins, District Engineer, L. T. McCormick was Resident Engineer and O. G. Carson, Inspector on the concrete.

Specify ROCKFORD OVER-CENTER for CLUTCHES

EASY OPERATION
HIGH TORQUE *
POSITIVE ENGAGEMENT
LARGE DRIVING AREA
SMOOTH RUNNING
INFREQUENT ADJUSTMENT
MINIMUM INERTIA



* Equally spaced, hardened and ground roller cams, bearing upon hard steel insets, exert heavy pressure evenly over the entire ROCKFORD Over-Center CLUTCH face—producing unsually high torque, for the clutch size and weight.

SEND FOR THIS HANDY BULLETIN ON POWER TRANSMISSION

It shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications. Every production engineer will find help in this handy bulletin, when planning post-war products.

ROCKFORD CLUTCH [FORMERLY KNOWN AS DRILLING MACHINE] DIVISION BORG-WARNER CORPORATION
314 Catherine Street, Rockford, Illinois, U.S.A.

ROCKFORD CLUTCHES
SPRING LOADED · OVER CENTER · ONE-WAY · SPRING LOADED · LOC · POWER TAKE-OFF · PULLMORE MULTIPLE-DISC · OVER CENTER

In many cases ARMCO Sheeting can be driven the full depth before excavating.

Jobs Go Faster
WITH CORRUGATED SHEETING

Let's see how ARMCO Sheeting does it—

This sturdy, light-weight sheeting goes in fast and easily because of its smooth surface and small displacement. It can readily be pulled and used over and over again, thus saving time and materials.

Another important advantage of ARMCO Sheeting is that you can order in the exact gage and type you need. The interlocking type, used where watertightness is desired, has a covering width of 14 inches and comes in 12 to 7 gage. The flange type, commonly used in sheeting trenches, is 12 inches wide and comes in 12 gage and heavier. Standard lengths of both types run from 6 to 20-feet or more. Write for complete information. Armco Drainage & Metal Products, Inc., and Associated Companies, 95 Curtis Street, Middletown, Ohio.

ARMCO SHEETING

State Road Widened, Topped With Hot-Mix

Contractor Crushed Rock At Local Quarry for Own Asphalt Plant on 27-Mile Rehabilitation Project

✦ AS part of the program of reconstructing highways which were victims of Army maneuvers, U. S. 70 N (Tenn. 24) has been widened and resurfaced with asphaltic concrete for a distance of 52 miles. To speed the work on this road, two contracts were awarded by the Tennessee Department of Highways and Public Works. The first contract, the subject of this article, covered the 27 miles from the city limits of Nashville, the state capital, to Lebanon, and was built by Eller & Olsen of Nashville, which used a quarry near the project to produce crushed rock for the black-top surface which was mixed at its adjoining asphalt plant.

Under the Congressional Act providing for reimbursement to states and political subdivisions for restoration of highways, streets, and bridges damaged by the Army on maneuvers, the Tennessee Department of Highways submitted a claim for reimbursement for the restoration of the original base and surface damaged by the Army. The cost of the widening, which is in the nature of an improvement, was borne by the State.

Laid in 1929-30, the old highway, which served as a base for the surfacing, was 20 feet wide with a 7-5-7-inch concrete base surfaced with a 1½-inch asphalt top. The recent improvement called for a 2-foot widening on each side, consisting of two layers of stone placed in an 8-inch trench and bonded by bituminous penetration. Over all this was placed 24 feet of plant-mix surfacing in two courses, 2½ inches of binder and 1 inch of top.

Preparing the Base

Eller & Olsen, the prime contractor, subbed the patching or replacing of deteriorated sections of the old road to Bowyer & Johnson Co. of Jackson, Tenn. About 70,000 square yards of old pavement had to be removed, from small patches up to sections a mile long covering the full width of the roadway. Jackhammers operated by compressed air were used to break up areas for the small patches, while in the larger areas the concrete base was shattered by a 2,500-pound drop hammer mounted in 14-foot leads on the back of a truck equipped with a single-drum hoist. The broken pieces of concrete were then removed by an Insley shovel with a ⅜-yard bucket and a Koehring shovel with a 1-yard dipper, loaded into trucks, and hauled to farms bordering the road, where the farmers gladly received the rubble for use in foundations for outbuildings or on their own roads.

A shovel skimmed a little dirt from the ditches or backslopes to place in the bottom of the hole to be filled with a concrete patch, in order to bring the excavation to grade. Small patches less than 100 feet in length were filled with concrete mixed in a Rex 27-E paver with a 30-foot boom, set up on a bank alongside the road so that it could deliver its batch to two Rex Moto-Mixers mounted on Ford trucks for further mixing and hauling to the site of the patching. Wooden 2 x 8's were used for forms at the edges of the road on small patches, but for lengths of 100 feet or more it was more economical to remove the full width of pavement and treat the patch as a paving operation.

In the small patches, preparation of the grade was done by hand tampers, and finishing was also done by hand. On the large areas, an Adams power grader prepared the grade, Blaw-Knox steel forms were used, and a Ted Carr Formgrader did the fine grading. The concrete was placed by a MultiFoote 27-E paver, followed by a Lakewood finishing machine and a Koehring Longitudinal Finisher. The smallest patch had a dimension of at least 8 feet in both directions, while the largest area replaced was a mile of full-width paving. The concrete was cured with an asphalt emulsion applied by spraying at the rate of 0.1 gallon to the square yard.

Road Joints

In the old concrete base the spacing of the expansion joints varied from 300 to 500 feet; these were constructed as open joints with a gap of 1½ to 2 inches which was filled with a sand-asphalt mix. Since their construction, many of these joints had nearly closed up, resulting in numerous blow-outs in the concrete paving. The contractor opened up these old joints to a width of at least an inch, using a jackhammer with a chisel-edged bit, and cleaned out all the old material. Also at 500-foot intervals new joints were cut across the old concrete by drilling 1-inch holes on 3-inch centers and picking out the remaining shattered fragments of concrete. These new joints are about 4 inches wide and were filled, as were all the other joints on the job, with loosely placed binder-course material. In the newly laid sections of concrete base, ¾-inch open joints were placed at 120-foot intervals. These open joints were formed by placing a wooden board at the joint and removing it before the concrete fully set. Dummy joints were placed at 30-foot intervals.

Widening the Road

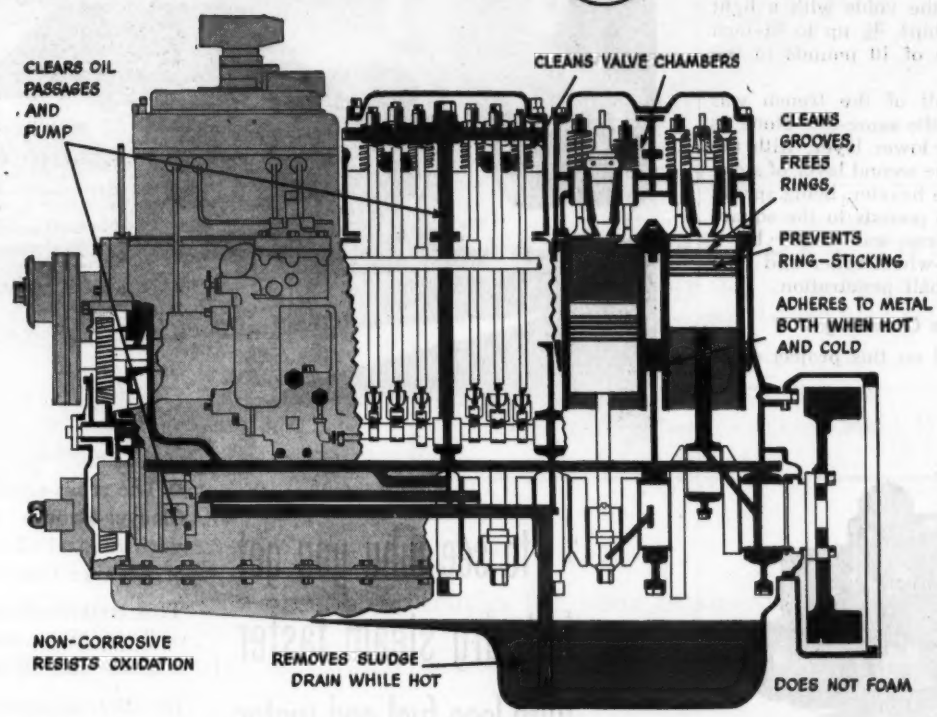
The contractor started his widening operations with a standard ditching machine to cut a 2-foot-wide trench 8 inches deep bordering the pavement on each side but found this method too slow. The widening then was done by first scarifying the adjoining strip of shoulder with an Austin-Western No. 99 power grader equipped with three scarifying teeth set 1 foot apart. An Adams No. 50 power grader with a 12-foot blade was outfitted with a steel moldboard 28 inches long x 8 inches deep securely welded and braced to the bottom of the blade. This section of moldboard was placed at the center of the blade and, to keep the blade from scraping the pavement while making the cut, a shoe, made from a piece of angle iron, 7½ inches long x 3 inches wide, was welded to the blade alongside the moldboard on the road side.

With the grader blade set at an angle of 45 degrees and the shoe resting on the pavement, the machine made a neat cut to the exact dimensions of 8 x 24 inches, removing no extra material

(Continued on next page)

STANDARD ENGINEERS NOTEBOOK

RPM CALOL


CLEARS OIL PASSAGES AND PUMP
CLEANS VALVE CHAMBERS
CLEANS GROOVES, FREES RINGS,
PREVENTS RING-STICKING
ADHERES TO METAL BOTH WHEN HOT AND COLD
NON-CORROSIVE RESISTS OXIDATION
REMOVES SLUDGE DRAIN WHILE HOT
DOES NOT FOAM

Heavy duty oil cleans engines while they're running

Clean carbon, sludge, gum and other harmful matter from heavy truck engines without tearing them down by purging with RPM Heavy Duty Motor Oil.

It will even loosen stuck rings if they are not cemented in too tightly with accumulations of sticky, burned-on gum.

Selected base oils plus patented compounds give RPM Heavy Duty Motor Oil the ability to act on and remove carbonaceous deposits and keep them dispersed in the oil so they can be drained from the engine. The recommended purging procedure follows:

1. Drain present oil from crankcase while hot. 2. Renew filter element to trap abrasive particles that may be carried into circulation during purging. 3. Fill crankcase with RPM Heavy Duty Motor Oil. 4. Run engine at a fast idle for two hours, maintaining water jacket temperature of approximately 200° minimum. 5. Drain again while hot and refill with RPM Heavy Duty Motor Oil. 6. Place engine in regular service and drain at one-half normal drain period or 750 miles, whichever comes first, for two or three drains. Check oil frequently as removal of deposits may temporarily increase oil consumption. 7. Drain while hot. Check oil filter and replace when necessary. 8. Refill with RPM Heavy Duty Motor Oil, returning to regular oil drain and filter change period, and continue to use RPM Heavy Duty Motor Oil.

For additional information and the name of your nearest Distributor, write Standard of California, 225 Bush Street, San Francisco 20, Calif., or California Commercial Company, 30 Rockefeller Plaza, New York 20, N. Y.

FOR EVERY JOB A STANDARD OF CALIFORNIA TEST-PROVED PRODUCT

State Road Widened, Topped With Hot-Mix

(*Continued from preceding page*)

which would result in an excess use of stone in filling the trench. The excavated material rolled from the special sectional moldboard to the grader blade which pushed it off on the shoulder. After the pavement was finished, this earth was graded with a blade to build up low spots in the shoulders which have a variable width of from 8 to 10 feet. With this equipment, the contractor could open a trench 1½ to 2 miles long in a single day, but the work was so scheduled that only 1,000 feet of trench on both sides of the road was opened up at a time, and this was filled with stone before proceeding with further excavation.

A trench roller compacted the excavation, riding with one wheel on the pavement and the other in the cut. The trench was then half filled with crushed stone, ¾ up to 2½-inch size, spread through a specially cut 2-foot-wide opening in the tail-gate of a truck. Behind the stone trucks came an Etnyre pressure distributor mounted on a Ford truck with the spray bar plugged except for five openings at the end 4 inches apart, through which the stone received a full 4-inch penetration of RC-8 asphalt at the rate of 0.7 gallon to the square yard. Another truck followed to fill the voids with a light layer of stone chips, ⅜ up to ¾-inch size, at the rate of 10 pounds to the square yard.

The upper half of the trench was then filled with the same-size stone as was used in the lower layer, with the exception that the second layer of stone chips was a little heavier, being spread at the rate of 25 pounds to the square yard. This course was rolled by a Galion 10-ton 3-wheel roller and then received its asphalt penetration.

Stone Crushing

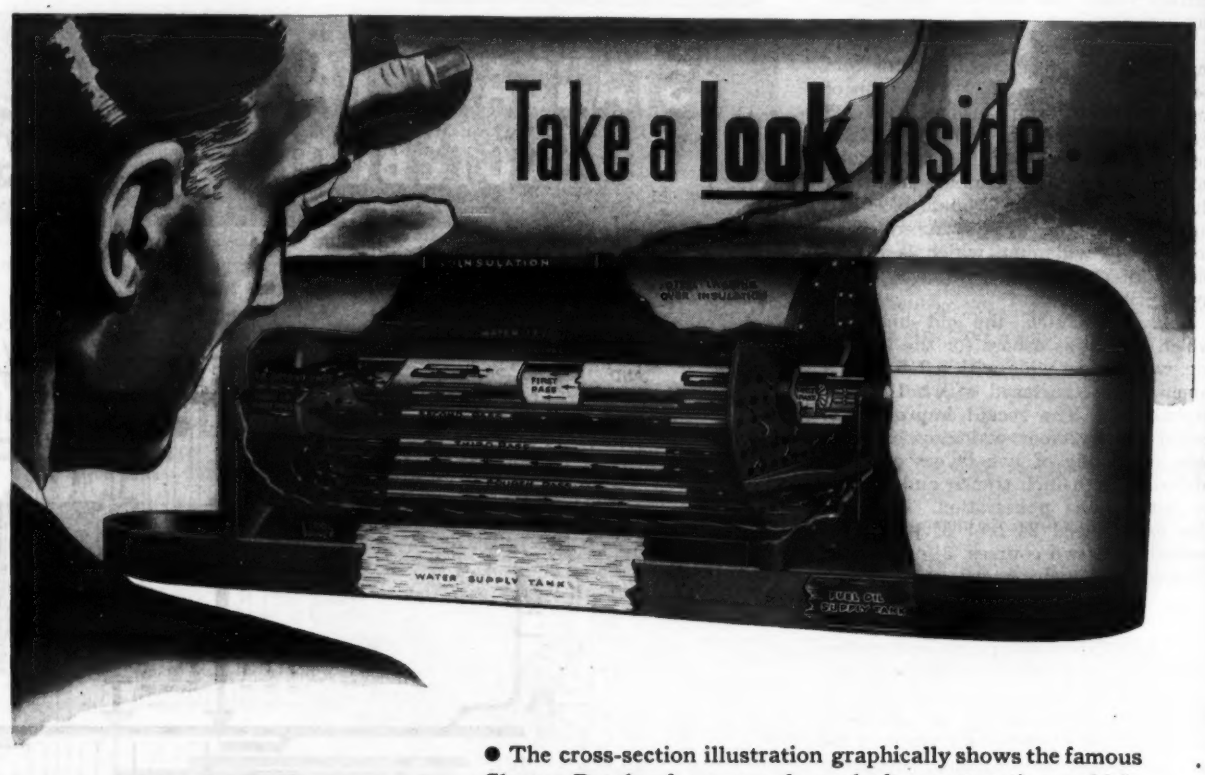
All stone used on this project came from a quarry leased by the contractor but operated with his own equipment. It contains a hard grade of limestone and is located 1¼ miles south of the road being built and about 10 miles east of Nashville. Used in the quarrying operations were one Cleveland and one Ingersoll-Rand jackhammer with 1½-inch drills, driven by two Ingersoll-Rand 210-cfm compressors; and a Cleveland wagon drill using drill steel up to 24 feet long with 2¾, 2½, and 2¼-inch bits, driven by a Gardner-Denver 315-cfm air compressor operated by a Caterpillar engine. Blasting was done with Hercules 40 per cent dynamite, and the broken rock was picked up by a Koehring shovel with a 25-foot boom and a 1½-yard bucket for loading into two Ford 1½-ton trucks owned by the contractor. To speed loading, the rock was pushed into piles by a Caterpillar D7 tractor equipped with a LaPlant-Choate bulldozer.

The trucks hauled the stone to the adjoining Cedarapids crushing plant which was equipped with a primary and secondary jaw crusher and a roll crusher and which produced, using only a single screen, from 800 to 1,000 tons of crushed stone a day. The stone was dumped into a hopper leading to the primary crusher, which was driven through eleven V-belts by an Allis-Chalmers 90-hp motor, and was next passed along to the secondary crusher,

(*Continued on next left-hand page*)

C. & E. M. Photo

Two Barber-Greene Tamping-Leveling Finishers lay 1-inch hot-mix surface course 24 feet wide on U. S. 70 N in Tennessee, part of a project to rehabilitate state highways damaged by Army maneuvers.



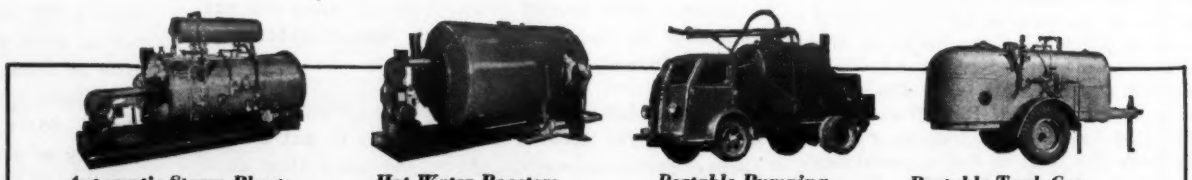
..to see why you get hot, dry steam faster with less fuel and water

● The cross-section illustration graphically shows the famous Cleaver-Brooks four-pass down-draft construction which, with integral oil-burner, accounts for the remarkable efficiency of Cleaver-Brooks steam generating equipment.

This construction doubles the lineal gas travel, compared to ordinary two-pass boilers,—the result is unmatched high heat transfer and efficiency.

No other equipment has this original and exclusive four-pass down-draft construction—plus the perfected positive dry coil method of condensate return—that's why you get hot, dry steam faster with less fuel and water with Cleaver-Brooks equipment. Write for bulletins and complete information.

CLEAVER-BROOKS COMPANY
5110 N. 33rd Street • Milwaukee 9, Wisconsin



Automatic Steam Plants
Completely self contained; highly efficient; require only simple piping connections to place in operation. Fully automatic fuel-oil burner; condensate recovery and feed water pumping system; no stack needed, sizes from 20 to 500 h.p.; pressures 15 to 200 lbs.

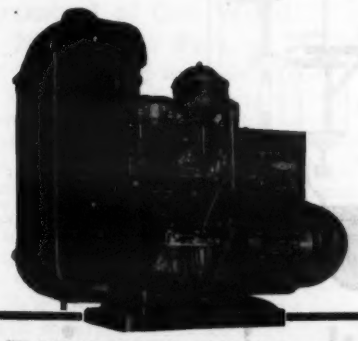
Hot Water Boosters
Oil-fired; fully automatic or manual operation; no licensed engineer needed; two capacity sizes: 3000 gals. storage tank for 1600 gals. of water heated 150° F. per hour; 1500 gals. storage tank for 800 gals. of water heated 130° F. per hour.

Portable Pumping Boosters
Heats bituminous material by direct firing in one operation, loading directly to distributor, relay truck or returning to tank car. Two sizes, truck mounting or 4-wheel trailer.

Portable Tank-Car Heaters
Available in 2 and 3 tank-car sizes. Oil-fired with exclusive four-pass flue travel; dry-coil steam condensate return under pressure — no water or heat loss. Provides a portable source of steam wherever needed.

Cleaver-Brooks

Pioneers and Originators of ★TANK CAR HEATERS ★BITUMINOUS BOOSTERS ★AUTOMATIC STEAM-PLANTS



ELECTRICITY

For All Contracting and Engineering Projects

● ONAN ELECTRIC GENERATING PLANTS supply reliable, economical electric service for engineering and contracting uses as well as for scores of other general applications.

Driven by Onan-built 4-cycle gasoline engines, these power units are of single-unit, compact design and sturdy construction. Suitable for mobile, stationary or emergency service.

Models range from 350 to 35,000 watts. A. C. types from 115 to 600 volts; 50, 60, 180 cycles, single or three-phase; 400, 500, and 800-cycle, single-phase; also special frequencies. D. C. types range from 6 to 4000 volts. Dual voltage types available. Write for engineering assistance or detailed literature.

D. W. ONAN & SONS
3453 Royalston Ave.
Minneapolis 5, Minn.

ELECTRIC PLANTS Onan

Famous Tonic for any business with light-hauling worries:

℞ New Ford Pickup Truck

TWO GREAT FORD ENGINES

The 100 H.P. V-8 • The 90 H.P. Six
Three-Quarter-Floating Rear Axle

BODY DIMENSIONS: Length 78¾ inches • Width 49 inches • Height 20.22 inches • Loading Height 23.73 inches • Load Space 45 cubic feet

New Ford Pickup Truck • Today's Ford Pickups are better trucks for *your* business—better trucks for *any* business. Exclusive Ford features and thirty-two important new engineering advancements make them roadworthy—streetworthy—farmworthy. Look below. You'll find advantages only Ford can offer—good, sound reasons why, year after year, official registrations show "More Ford Trucks on the Road, on More Jobs, for More Good Reasons!"

MORE ECONOMICAL, MORE RELIABLE, MORE ENDURING THAN EVER!

TWO great engines—the rugged 100 H.P. V-8 with engineering advancements designed for increased economy, efficiency and convenience of servicing, or the 90 H.P. Six, for jobs that call for economical stop-and-go driving. Truck-type frame. Side-mounted springs. Three-quarter-floating rear axle with straddle-mounted pinion and 4-pinion differential. Four double-action shock absorbers. Note the generous dimensions of the heavy-gage steel Ford Pickup body—45 cubic feet of load space—wide enough for flat-loading of such 4-foot units as plywood or plasterboard (no wheel housings). Low loading height. Floor is heavy-gage steel-surfaced, with formed skid-strips and hardwood under-flooring. Tailgate, strong and rattle-free, swings full-down for easy loading.

Priorities No Longer Needed. Ford **See Your Ford Dealer!** **FORD TRUCKS**

State Road Widened, Topped With Hot-Mix

(*Continued from preceding left-hand page*)

driven by a similar motor. From here the stone was carried by a conveyor belt, 30 inches wide and 150 feet long, to a 4 x 10-foot flat vibrating screen which, during the crushing of stone for the plant-mix, used ¼, ½, 1½, and 1¾-inch openings.

Stone that would not pass the 1¾-inch screen was directed to a 24 x 40-inch roll crusher driven through nine V-belts by an Allis-Chalmers 100-hp motor, after which it was sent up a 21-inch-wide x 60-foot-long conveyor belt to the main conveyor and thence back to the screen. Beneath the screen were two bins, one holding 25 tons in which the stone up to ½-inch was stored, and the other of 40-ton capacity which contained the 1½ and 1¾-inch sizes. Electricity to drive the plant motors came from a nearby power line.

From the bins the stone was hauled to the asphalt plant, which was only ¼ mile away, by three Ford 5-ton trucks which were rented on a daily basis instead of by the load because of the short haul involved. The stone for the penetration widening was stockpiled at one end of the plant and delivered to from four to six trucks by a Haiss loader. The stone for the plant-mix was stockpiled against a wooden barricade 40 feet long x 12 feet high which had a hole at the center at ground level through which the stone fell onto a feeder belt. A Koehring 301 crane with a 40-foot boom and a 1¼-yard clamshell bucket continuously fed the stone to the center of the barricade so that the belt was always uniformly loaded.

Asphalt Plant

The only commercial material used in the road construction was the asphalt which was bought from the Shell Co. at Norco, La., and brought in tank cars 500 miles to the asphalt plant which was located on a spur track of the Tennessee Central Railroad. Two 30,000-gallon vertical tanks stored RC-7 asphalt, used in the base or binder course, and RC-8 asphalt for the top course. Another 16,000-gallon tank held RC-2 asphalt used in the prime coat. Fuel oil was stored in a 12,000-gallon tank.

A coal-burning 60-hp horizontal locomotive-type boiler supplied steam for heating the asphalt, the steam-jacketed pipes, operating the gates on the pugmill, and driving the two Kinney asphalt pumps, a 3 and a 4-inch, which unloaded the tank cars, transferred asphalt from tank to tank, and pumped asphalt to the pugmill. On top of the asphalt tanks were pressure relief valves regulating the flow so that the asphalt which was not used in the pugmill went back into the storage tank.

The plant was a Simplicity unit with a 25-foot cold bucket elevator conveying the stone from the feeder to a dual-drum drier, 18 feet long x 9 feet in diameter, heated by a Ray oil burner. Stone dust leaving the top of the drier passed into a dust bin silo and then down to the foot of the hot elevator where, with the hot stone, it was carried up 42 feet to a double 3 x 10-foot vibrating screen. Four sizes of mesh classified the stone into ¼, ½, ¾, and 1½-inch sizes and delivered it into a 4-compartment 30-ton bin whence it was proportioned by a batcher equipped with Kron dial scales. The stone was mixed with the asphalt in a 2,500-pound pugmill. Twin International diesel engines drove the plant, one operating the stone feeder belt, the cold elevator, and the draft fan in the dust bin, while the other drove the hot elevator, the vibrating screens, and the pugmill.

A crew of 8 was used at the asphalt plant, including the plant operator, 2 firemen, 2 men filling and discharging the pugmill, a burner operator, an oiler, and one laborer. A fleet of ten trucks,

(*Concluded on next page*)

HENDRIX
Lightweight DRAGLINE BUCKETS

TYPES

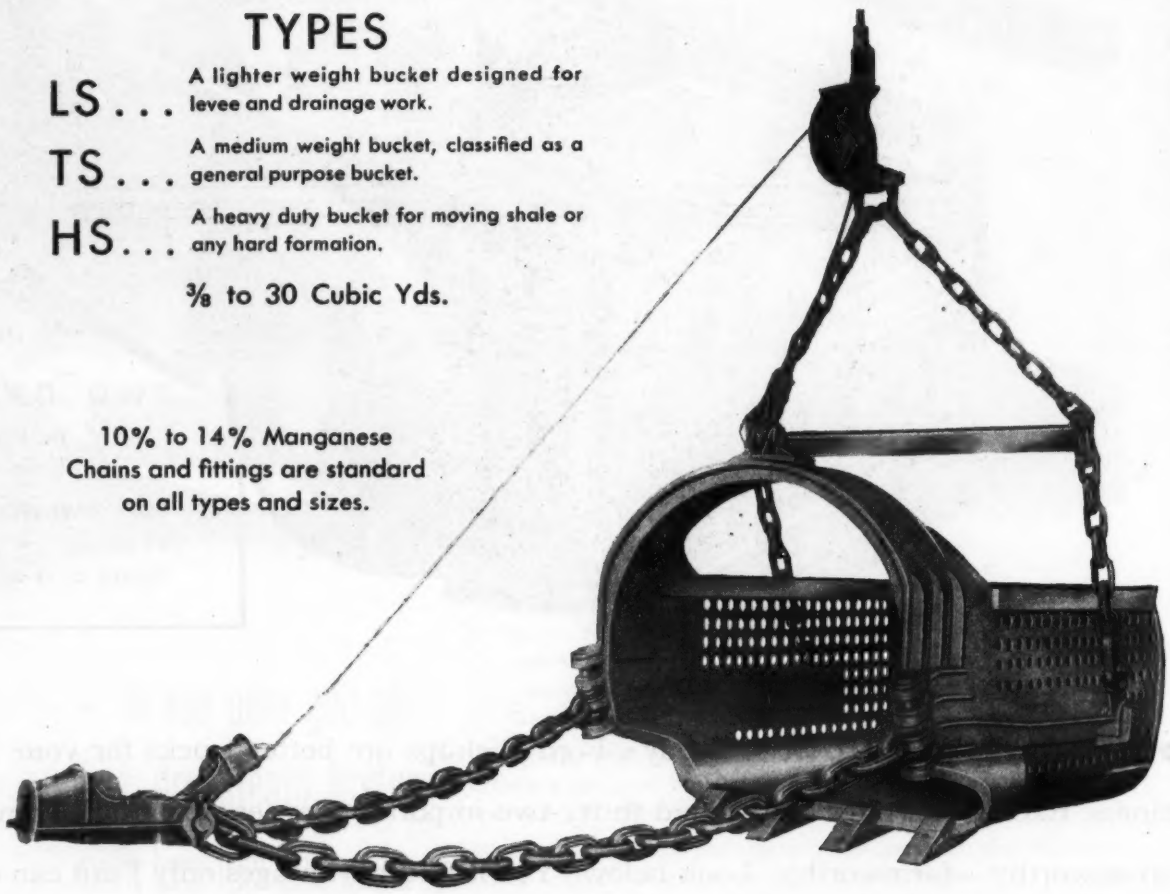
LS . . . A lighter weight bucket designed for levee and drainage work.

TS . . . A medium weight bucket, classified as a general purpose bucket.

HS . . . A heavy duty bucket for moving shale or any hard formation.

⅜ to 30 Cubic Yds.

10% to 14% Manganese
Chains and fittings are standard on all types and sizes.



WRITE FOR DESCRIPTIVE LITERATURE—
OR ASK YOUR DEALER

Also available without perforations.

DESOTO FOUNDRY, INC. · MANSFIELD, LOUISIANA

ROGERS GIRDER TYPE

the BETTER trailer for your BIGGER hauling jobs

THIS trailer, designed by Rogers Brothers to meet low headroom conditions, has been used for some time in certain sections of the country. Now, because of the larger equipment in use, it is coming into extensive use elsewhere.

ROGERS BROS. CORPORATION
ALBION,
PENNA.

State Road Widened, Topped With Hot-Mix

(Continued from preceding page)

each holding five batches or 6¼ tons, was used to transport the hot-mix to the road. These trucks were all rented on a tonnage basis. A typical batch of binder and top course was proportioned by weight as follows:

Binder Course Material	Pounds
1½-inch to No. 4 stone	1,488
No. 4 to No. 20 stone	900
RC-7 asphalt	112
Total	2,500

Top Course Material	Pounds
½-inch to No. 8 stone	300
No. 8 to No. 40 stone	300
No. 40 to No. 200 stone	1,731
RC-8 asphalt	169
Total	2,500

Laying the Plant-Mix

Before any binder was laid, the base was first thoroughly swept by a power broom pulled by a truck, after which the old 20-foot road was given a prime coat of RC-2 asphalt at the rate of 0.1 gallon to the square yard. This was allowed to stand at least three days before the binder course was laid.

During the laying of the plant-mix courses all but local traffic was sent over detours while cars in the neighborhood could generally pass construction operations on the shoulders. The asphalt trucks hauled the plant-mix a minimum of 1½ miles to a maximum distance of 18 miles, depending on the position of the two Barber-Greene Tamping-Leveling Finishers which moved along the road in echelon within 30 to 50 feet of each other. These positions were maintained so that no center-line joint would be apparent, since the rollers compacted the two sections together at the center immediately after they were laid.

The finishers were regular 10-foot machines but had a 1-foot extension at each end in order to pave the full 24-foot width. Two days were usually given to laying the 2½-inch binder course and the following day this area was covered with the 1-inch top course. Compaction was achieved by a Galion 8-ton tandem roller and an Austin-Western 10-ton 3-wheel roller. The average total output of both finishers for a 10-hour day was 650 tons. The maximum record attained was 5,335 linear feet of top course laid full width.

The paving crew consisted of 11 men, including a foreman, 2 Barber-Greene operators, 2 roller operators, 2 asphalt rakers, 2 lute men with drag straightedges, and 2 laborers who emptied the trucks, and also carried back any asphalt mix to the rakers or lute men. In addition to this 11-man paving crew and the 8-man crew at the asphalt plant, 8 others were engaged in the penetration-macadam widening and 15 were used at the quarry. The contractor thus had a total force of 42 men, not counting an average of 20 drivers on the hired trucks.

Quantities and Personnel

The major items involved in this 27.3-mile improvement through Davidson and Wilson Counties were as follows:

Removing concrete base and rock-asphalt surface	70,600 sq. yds.
Crushed-stone penetration-macadam base widening	22,780 tons
Bituminous material, penetration-macadam base	341,770 gals.
Cement-concrete base, 8-inch	77,300 sq. yds.
Asphaltic concrete, binder course	53,464 tons
Asphaltic concrete, top course	19,025 tons

Eller & Olsen of Nashville, Tenn., was awarded this contract on the low bid of $725,000, and sublet $240,000 of the work to Bowyer & Johnson Co. of Jackson, Tenn., for the removal and replacing of the concrete base course. Work was started in August, 1944, but was shut down for the winter in November and resumed in March. C. R. Wilbourne was Superintendent for Eller & Olsen, and R. L. Tapscott was Foreman of the asphalt plant. C. J. Greek was Resident Engineer for the Tennessee Department of Highways.

The remaining 25 miles from the end of this contract at Lebanon eastward to the Putnam County line between Carthage and Cookeville was similarly constructed by the Wolfe-Michael Co. of Memphis, Tenn., with the black-top plant-mix work being done by the Wesco Co. of Chattanooga. Both contracts, for a total of 52 miles, were finished by September. This construction was located in Division 3 of the Tennessee Department of Highways of which R. J. Love is Division Engineer, and H. D. Long is Division Construction Engineer. C. W. Phillips is Commissioner and W. T. Brooks is State Highway Engineer.

Koppers Names Sales Mgr. Of Tar & Chemical Div.

Thomas C. Keeling has been named General Sales Manager for the Tar & Chemical Division of Koppers Co., Inc., Pittsburgh, Pa. Mr. Keeling has been Chief of the Chemical Section, Production Division of the War Department, with the rank of Lieutenant Colonel. Prior to entering service in 1941, he served as Sales Engineer for the Niagara Alkali Co., Buffalo, N. Y.

Thermo-Control Fan Discussed in Booklet

The Evans Thermo-Control fan for automatic precision temperature control of coolants in internal-combustion engines is the subject of a 16-page booklet just issued by the Evans Products Co. Copies may be obtained by readers of this magazine who address the firm at Fullerton & Greenfield Sts., Detroit 27, Mich., and mention CONTRACTORS AND ENGINEERS MONTHLY.

The illustrated pamphlet is arranged in question-and-answer form on the basis of inquiries received from the field concerning the fan. The function and operation of the device, its effect on the lubricant and coolant, its adaptations, and other factors are discussed.

ANCHOR

Flexible Hydraulic Hose Assemblies and Oil Lines

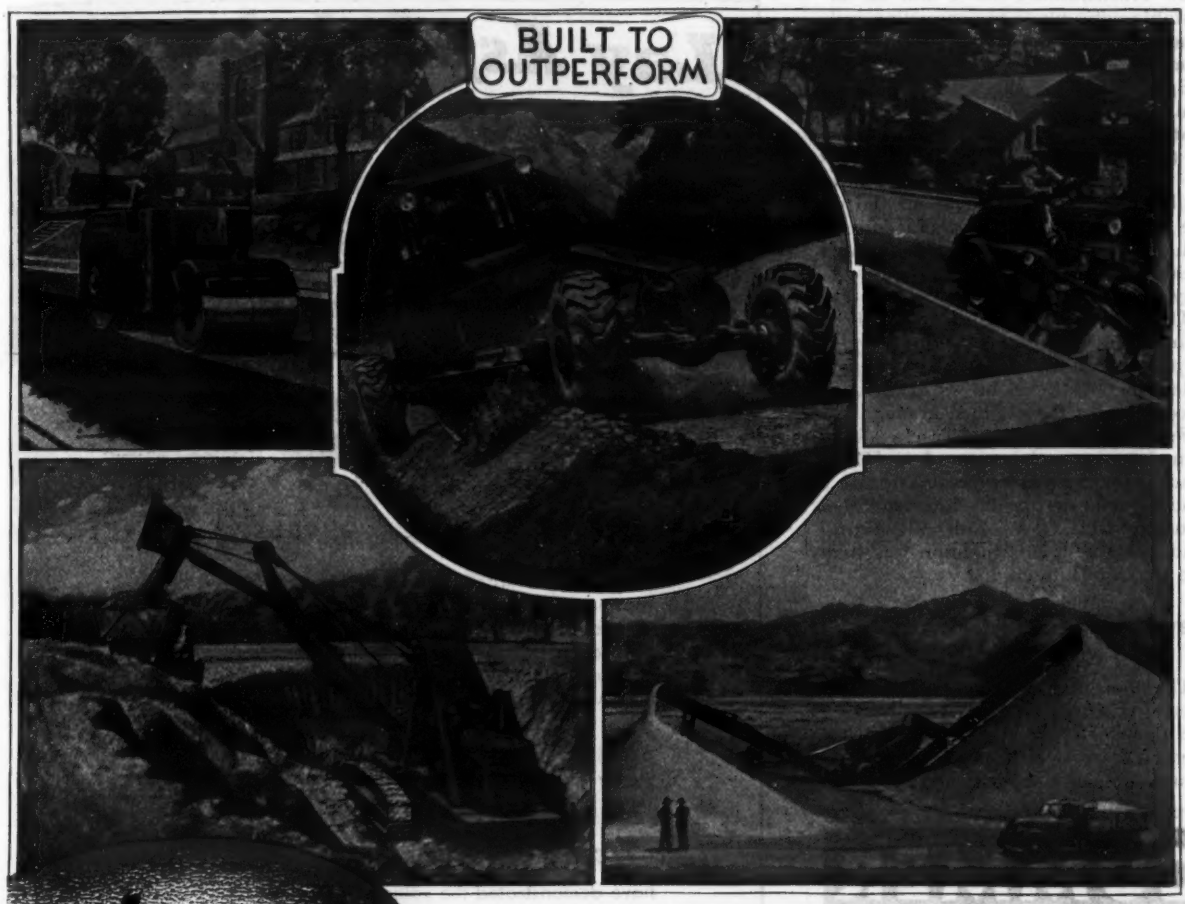
ANCHOR employs a Ductile Sleeve High Pressure Coupling designed by its own engineers that assures maximum life of the hose installation. Highly flexible units available in specified lengths from 3/16" I.D. to 1½" I.D. Also a complete stock of medium and low pressure hose assembly styles.

Experienced Fabricators:

- High Pressure
- Low Pressure
- Medium Pressure
- Hose Assemblies

• • •

ANCHOR COUPLING COMPANY, Inc.
342 N. Fourth St., Libertyville, Ill.
Factory Branch
12341 Cloverdale Ave., Detroit, Mich.



Built to Outperform

Whether it's . . .

√ The matchless performance of All-Wheel Drive and All-Wheel Steer in a Power Grader . . .

√ Vibrationless operation in a Road Roller . . .

√ The "no conveyor" feature in a Street Sweeper . . .

√ ¾-swing for greater work output in a Crawler Shovel . . .

√ Deeper jaws and higher operating speeds, for greater capacity in a Jaw Crusher . . .

. . . whether it's one of these things, or something else, you can buy any Austin-Western product with confidence that it will OUTPERFORM in ways that mean more work, better work—faster and cheaper.

AUSTIN-WESTERN COMPANY, AURORA, ILL., U.S.A.

BUILDERS OF ROAD MACHINERY
Austin Western
SINCE 1859

The Trackwalking Wingdozer for railroad track work consists of Esco shoes and wing blade on a crawler tractor.

Crawler-Type Tractor For RR Track Upkeep

A Trackwalking Wingdozer, capable of operating on a railroad track in the manner of normal railroad equipment, has been announced by the Electric Steel Foundry. The machine is a crawler-type tractor equipped with Esco Trackwalking Shoes and an adjustable wing blade for spreading railroad ballast and maintaining uniform grade.

Special pads or shoes, which have a flange running along them similar to that on a railroad car's wheel, are used on the tractor. They do not impair its off-the-track performance. The Trackwalker is able to maneuver on and off the track at will. This factor proves valuable on main lines where through trains have to be given the right-of-way at frequent intervals.

The tractor is fitted with the Esco Wingdozer which is removable, similar to a standard bulldozer. The adjustable wing blade can be set at any desired angle of the roadbed grade.

Full details on this Trackwalking Wingdozer may be secured by CONTRACTORS AND ENGINEERS MONTHLY readers who write the Electric Steel Foundry, 2141 N. W. 25th Ave., Portland 10, Oreg. Just mention this item and ask for Bulletin 153.

New Tunnel and Bridge For City in Virginia

The plans and specifications for much needed traffic facilities between Norfolk and Portsmouth, in the Hampton Roads area of Virginia, will now be pushed to completion by the Elizabeth River Tunnel Commission. The Federal Works Agency has furnished $50,000 to permit the completion of contract plans for this $12,100,000 project.

It is planned to construct a two-lane vehicular tunnel under the Southern Branch and a four-lane bridge over the Eastern Branch of the Elizabeth River, together with the necessary approaches, highway connections, and appurtenant work. The project has been under study for 15 years.

There has been a tremendous population increase in the area since 1940, due to increased ship-building and harbor facilities and extensive Army and Navy installations, and this population is at present largely dependent on ferry service.

A-C Northwest Manager

The sales district of Alaska, Yukon Territory, and British Columbia will be under the supervision of E. L. Aikins, in his new post as Seattle District Manager for the Tractor Division of the Allis-Chalmers Mfg. Co. Prior to his promotion, he served as Sales Promotion Manager at the home office in Milwaukee. Mr. Aikins was formerly Industrial Service Manager for the Tractor Division, and, at one time, Block Manager at Portland.

His predecessor in the Seattle post, S. B. Tatom, resigned recently to become President of Lomen Equipment, Inc., which serves as Allis-Chalmers outlet in Alaska. A similar function is performed in the Yukon and British Columbia districts by the Rendell Tractor & Equipment Co., located in Vancouver, B. C.

Yes, many contractors have done just that with KOTAL Master Mixes. An Indiana city engineer confessed he was amazed at the results when his contractor, working long before the normal time for spring repairs, merely swept the snow and water from the potholes and laid the KOTAL Mix right on the cold stone base.

And, that's not all! After slight tamping, traffic rolled over the repaired roads and found a remarkably firm, stable surface, practically the equal of any asphalt laid under ideal summer conditions.

Six Years of Use

have demonstrated the value of KOTAL Master Mixes as all-weather, easy-to-use mixes that help the contractor achieve tough, long-wearing roads.

Low Cost Application

KOTAL Master Mixes do not require skilled help to lay. Savings are shown on both time and labor costs.

The contractor who is looking ahead to those early spring repairs will find NOW a good time to study the benefits of KOTAL Master Mixes:

Eight Working Features of KOTAL Master Mixes

EASY TO USE. Quickly mixed, ready to lay. No preheating or drying.
STABILITY. Cure quickly and permanently. Do not shift, ravel or pick up. Open sooner to traffic.
WORKABILITY. Do not adhere to equipment. Work easily.
LONG-TERM STOCK PILES. Can be stock-piled for many months without losing workability.
SAVE TIME. Quickly made stock piles ready for immediate use without frequent fresh mixes.
SAVE LABOR. Actual road records prove fewer labor hours required.
SAVE MONEY. Savings in time and labor mean economies in road costs.
EXTEND PAVING SEASON. All-weather workability permits more months of operation.

Write for your copy of booklet which tells the story of KOTAL Master Mixes. We will also send you the name of your nearest supplier.

MASTER MIXES KOTAL **KOTAL COMPANY ★ 52 Vanderbilt Ave. ★ New York 17**

KOTAL *Master Mixes*

The Advanced All-Weather Aid in Building Better Roads

CUMMER

ASPHALT PLANTS

EIGHT SIZES
Up to 1000 Tons per day

DRYERS
Two-Fire and Internal Fire
30 to 100 Tons per hour

Electric Batch Timers

50 Years' Experience

THE F. D. CUMMER & SON CO.

EAST 17th & EUCLID
CLEVELAND 15, OHIO

FASTER—SAFER—ELIMINATES SPLICING

Millions in daily use prove *Safe-Line* the right way to hold wire rope securely. It's the better way, too!

Better because *Safe-Lines* are faster than splicing and serving, or using U-bolts.

Better because *Safe-Lines* outpull the strongest rope, hold a tight thimble, minimize rope or sling breakage.

Better because *Safe-Lines* are easy to use and re-adjust, without special tools or skilled labor.

Better, too, because *Safe-Lines* enclose sharp wire ends, preventing personal injury and mental hazards.

Try this better way that saves you time and money.

Approved BY UNDERWRITERS' LABORATORIES AND CIVIL AERONAUTICS ADMINISTRATION

FORGED AND MASTER COINED TO FIT ROPE SIZES 1/16" TO 3/4"

Safe-Line double spiral splines fit each wire and strand, providing a *never slip* grip, without cutting action to the rope. Replacement guarantee on clamp against breakage and fracture.

WRITE FOR DESCRIPTIVE PRICE-LIST FOLDER

NATIONAL PRODUCTION COMPANY
4559 ST. JEAN AVENUE - DETROIT 13, MICHIGAN

Change of Address

(Mail to Contractors and Engineers Monthly, 470 4th Ave., New York 16, *today*)

From _____
(Former address)
To _____
_____
_____
(New address)
_____
_____
Name _____
Firm _____
Position _____

Concrete Pipe Used To Replace Bridges

County Effects Savings During Lumber Shortage By Eliminating Wood Span And Laying 48-Inch Pipe

✦ TO cope with the high cost and scarcity of lumber for replacing wooden bridges, Effingham County in southeastern Georgia is substituting 48-inch concrete pipe, wherever possible, for worn-out wooden spans. This county lies in the coastal plain northwest of Savannah where many small flash streams meander through the countryside, requiring a large number of wooden bridges to carry the county road system. These bridges have to be rebuilt on an average of every four years because of the limited life and durability of lumber in this semi-tropical climate. The shortage of timber has made the task of rebuilding the bridges impossible, so concrete pipe, which is estimated to last for one hundred years, is being laid at a much lower cost than building a new wooden bridge.

A typical example of such construction was the recent replacement of the 50-foot wooden trestle bridge on Monteith Road over Waldhour Branch Creek southwest of Springfield, the county seat. The existing bridge, built of untreated pine, consisted of three 3-pile bents made from 10-inch piles, 14 to 16 feet long, and capped with 10 x 10's. Ten 4 x 10-inch stringers on each span supported a 3-inch deck made from 3 x 6's, 3 x 8's, or 3 x 10's, forming a 16-foot roadway. Already rebuilt several times, the bridge timbers were rotting and in need of replacement, with no lumber available for that purpose.

Consequently, to carry the stream, six lines of 48-inch concrete pipe were laid by county forces, replacing the old timber structure. During the construction, the road was closed and traffic detoured over a parallel route during the week in which the old structure was removed and the new pipe laid.

A crew of four men dismantled the wooden trestle, beginning at one end by removing the railing, deck, stringers, and caps. The piles were pulled by fastening a steel cable around them and tying the other end to the 30-foot boom on a Northwest crane set on the bridge deck. The piles were pulled loose by the crane and salvaged, if possible, along with any other lumber that might be fit to use in regular county maintenance. Wood that was beyond salvage was hauled to the county prison camp for use as firewood. Only one span of the wooden bridge was removed at a time in order that the crane could set the pipe from the deck still remaining in place.

Setting the Pipe

The 48-inch-diameter concrete pipe is 5 inches thick and is reinforced with two layers of steel mesh. For this particular location, six lines of pipe, which comes in 4-foot lengths, were needed, with nine lengths of pipe to each line, making a total of 216 feet of pipe. The crane with a ½-yard clamshell bucket leveled off the creek bottom so that the pipe would have an even foundation, and also built low earth dams at the upstream end of one span and along the side to enable the pipe setters to seal the joints in the dry. While the main channel of the creek was thus diverted, any water that did percolate through the low dikes was removed by a Marlow 3-inch pump.

At each end of the line, both intake and outfall, the 4-foot length of pipe is supported on a foundation of burlap bags filled with a mix of one part of cement to five parts of sand. These two materials were mixed thoroughly on the ground with sharp-pointed shovels before being loaded into feed bags which were tied at the top and tamped into place. The bags were arranged four wide in a double tier under each end joint, and were also employed to build a headwall on each side of the drainage structure, with wings, five bags long, jutting out on a 45-degree angle at either end. The height of the wings tapered off from the headwalls to a single bag at their extremity.

The joints of the pipe were sealed, both inside and out, with a mortar of one part of cement to two parts of sand, and pointed up with a trowel, making a water-tight connection. In some cases where the site of the pipe-laying could not be completely dewatered, diaper joints made up of muslin with draw strings were thrown around the abut-

(Continued on next page)

A Northwest crane on the deck of an old timber bridge swung into place the sections of concrete pipe used by Effingham County, Ga., to replace the old structure.

Ask G.I. Joe about GMC Pulling Power

On every battle front G.I. Joe saw proof of GMC's pulling power. In the South Pacific, in temperatures as high as 130 degrees, GMC "six-by-sixes" hauled huge loads through hub-deep mud and sand. In Europe, GMCs played the leading role on the famous Red Ball Express. In Alaska's ice and snow, Burma's jungles and Italy's mountain trails... wherever heavy loads were pulled through heavy going... GMCs did the job.

G.I. Joe knows about GMC pulling power . . . and what he can tell you is mightily important to truck buyers. For GMC commercial models, ½ to 20 tons, have engines of the same basic design as their military brothers. They offer the civilian counterpart of the power, performance and stamina demonstrated by nearly 600,000 GMC "Army Workhorses."

The famous "270" engine, power plant of the "Army's Workhorse," also powers GMC models in the 3-ton range. All other GMC gasoline engines are of the same basic, war-proved design.

THE TRUCK OF VALUE GMC TRUCKS GASOLINE • DIESEL

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

Concrete Pipe Used To Replace Bridges

(*Continued from preceding page*)

ting ends of the pipe and filled at the top with a sand-cement mortar mixed in a small concrete mixer.

When one section was completed, the crane moved back across the bridge to dismantle another span, after which the site was leveled and the stream diverted by a small earth dam. The concrete pipe was hauled 18 miles from the Scott Concrete Pipe Co. plant in Savannah on long trailer trucks which brought it to the bridge site where it was unloaded by the crane and placed in position by the use of a conventional pipe hook 36 inches long.

Backfill

As each section or span of the old bridge was replaced with pipe, it was backfilled and covered to a compacted depth of 30 inches above the top of the pipe with a selected sand-clay borrow material. This fill was secured from a pit within ½ mile of the bridge site and excavated by the crane and clamshell bucket. Three Ford 1½-ton trucks hauled the material to the side of the creek where it was stockpiled until needed. As the lines of pipe were laid 5 feet 10 inches on centers, this gave a 12-inch clearance between the outside of the pipes at mid height, assuring enough room for the crew to hand-tamp the backfill thoroughly under and around the sides of the pipe. Rain and the flow of the creek soon hardened the sand-cement mix in the burlap bags erected as head and wing walls to form a solid buttress against any erosive action by the water.

This work was done by a five-man crew consisting of a foreman, a crane operator, and three negro convicts from the Effingham County Public Works Camp. The war and Selective Service, incidentally, greatly reduced the number of prisoners available for road work, for this camp, which in normal times has about 100 inmates, at the time of this project had only 22 serving sentences for various misdemeanors and felonies.

County officials estimated the cost of building this pipe drainage structure at $2,800, which included all material and rental of equipment such as crane, trucks, etc. In comparison, the cost of lumber to replace this bridge, even if it could have been secured, would have been $3,600. In both estimates, the cost of labor, which would be about equal on both jobs, was omitted since the convicts are not paid for their work.

Large Program

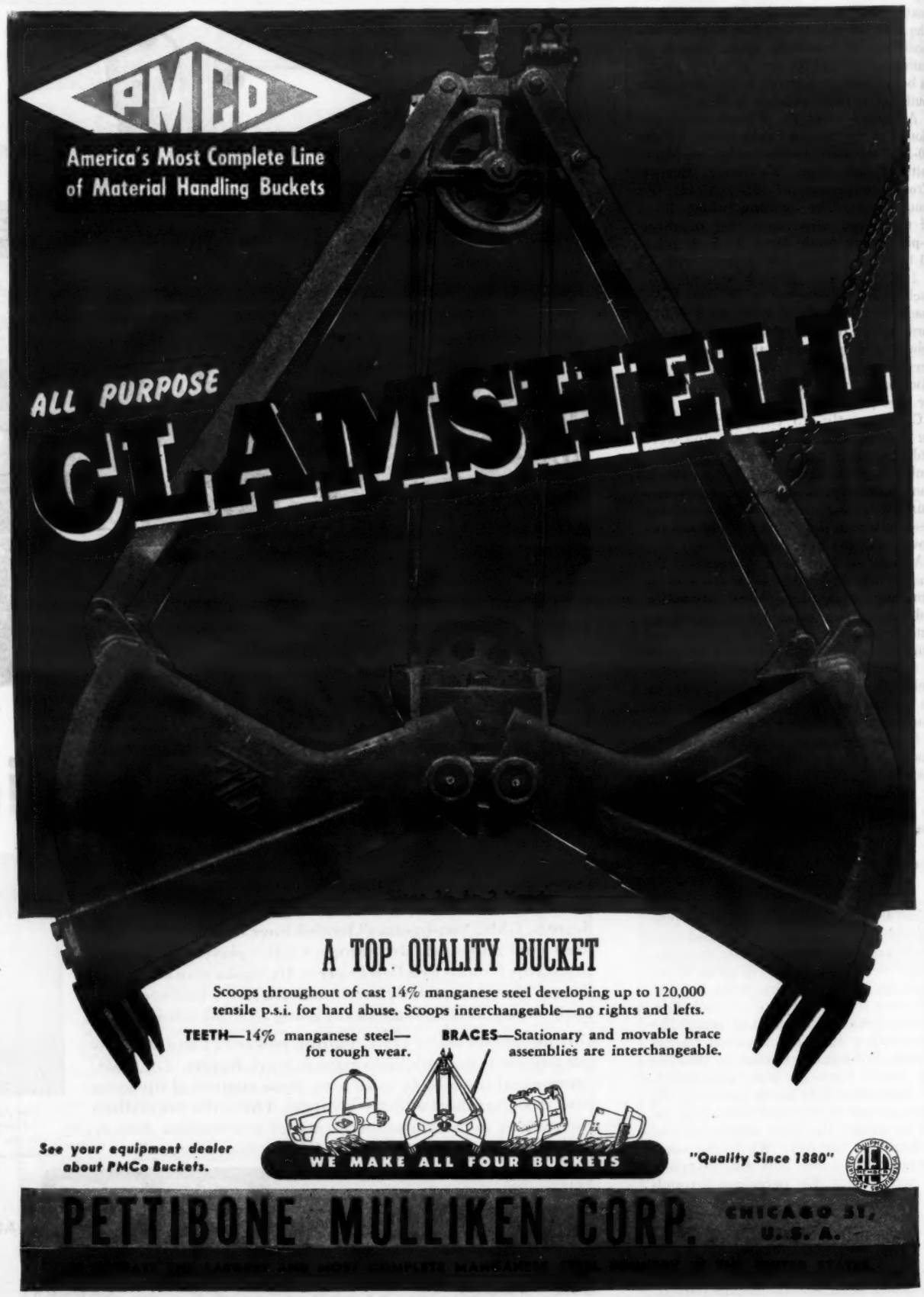
In addition to this project, the County last year replaced sixteen other wooden bridges with concrete pipe. Ten of these structures were built with 48-inch pipe. nine joints to a line, with from three to eight lines taking the place of the former bridge. In one exceptional case, however, a 290-foot trestle-bent bridge was replaced by twenty-one lines of concrete pipe, nineteen in a row, with the remaining two lines under one end of the drainage structure where the channel deepens. A crane was used in setting all this large-size pipe, but in the remaining six bridges which were replaced with either 24-inch or 36-inch pipe the work was all done by hand labor.

There are still in the county seven bridges where the volume of flow is too great to permit the substitution of pipe. At these locations the depth of water is 4 feet or more, and the pipe would not furnish as great an open area as would a bridge in conducting a stream of water. These bridges will have to be rebuilt with lumber, which if it can be obtained will cost around $75 per MBM when purchased in large lots of 100,000 board-feet. This is more than double the cost of lumber when the bridges were rebuilt last prior to the war. Bridge-maintenance cost is a serious matter in Effingham County which has no large manufacturers to help defray, in taxes, the cost of a road program which consequently must be financed entirely by small farmers and land owners.

Because of the critical lumber shortage, Effingham County in Georgia substituted reinforced-concrete pipe for bridge structures at a number of sites in its bridge-replacement program. It was found that both construction and maintenance costs are lower for the pipe projects.

Before the 290-foot wooden bridge was replaced with concrete pipe, the County got some estimates on the cost of building a new timber bridge, using treated material. The average cost of a new bridge came to around $100 per linear foot or $29,000 for the structure. Using convict labor, the County figured it could build a new superstructure for $5,200 but this did not include replacing any piles. Both of these proposals were predicated on the ability to secure the necessary lumber, the procurement of which was most uncertain. The actual cost of the new pipe drainage structure was slightly under $7,000, including the cost of the pipe and joint materials;

(*Concluded on next page, Col. 2*)


PMCO
America's Most Complete Line of Material Handling Buckets
ALL PURPOSE
CLAMSHELL
A TOP QUALITY BUCKET
Scoops throughout of cast 14% manganese steel developing up to 120,000 tensile p.s.i. for hard abuse. Scoops interchangeable—no rights and lefts.
TEETH—14% manganese steel—for tough wear.
BRACES—Stationary and movable brace assemblies are interchangeable.
See your equipment dealer about PMCo Buckets.
WE MAKE ALL FOUR BUCKETS
"Quality Since 1880"
PETTIBONE MULLIKEN CORP.
CHICAGO 51, U. S. A.

Light weight and ease of handling are features of the new cast-aluminum hand truck now being produced for the civilian market by Northrop Gaines, Inc., Hawthorne, Calif. Equipped with molded rubber tires and Timken tapered roller bearings, it will carry a 700-pound load of sacked cement.

Cold-Working Improves Hand-Shovel Strength

A wartime development in the field of hand-shovel manufacture is the cold-working of the steel following heat treatment so as to increase its toughness, the Union Fork & Hoe Co. reports. Known as "surface-peening", the process is said to make the shovel 2½ to 5 times more resistant to the constant bending which causes shovels to break at the frog or shank.

In normal use, shovels are subjected to two-way stress, the greatest strain occurring at the frog, which is just below the socket. Compressive pressure on one side of the shovel and an equal tension on the other alternate to cause gradual cracking of the steel's surface, and subsequent breaking of the blade. A metal that has been "surface-peened" after heat treatment maintains a surface that does not fold when compressed and so has greater crack resistance on bending, it is stated.

In addition to the ability to endure constant bending, the Union shovel also features Razor-Back construction. This incorporates a heavy backbone section of 13-gage steel from the cutting edge through the socket, and a lighter 17-gage steel along the lesser-used edge strips, to give a 15-gage overall weight. An 11-inch socket is formed from the heavy backbone steel for added strength and stiffness.

Full details on "surface-peened" Razor-Back shovels may be secured by writing the Union Fork & Hoe Co., 662 Hocking St., Columbus 15, Ohio, and mentioning CONTRACTORS AND ENGINEERS MONTHLY.

A Design Data Book For Civil Engineers

A remarkable collection of civil-engineering design data is made available in a new book by Elwyn E. Seelye, Consulting Engineer of New York City. The list of engineers who opened their files to make data available for this 683-page book of 8 x 10½-inch printed pages reads like a selected Who's Who Among Engineers.

The book is entirely tabular and diagrammatic in its presentation and covers design in the following fields: structural, general, concrete, steel, wood, plywood, and foundations; soils; earth work; roads; railroads; airports; bridges; transmission towers; dams; docks and piers; corrosion of metals; athletic fields; drainage and sewerage; sewage treatment; waste disposal; and water supply, purification, and distribution. The volume has a detailed index.

This book is published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., and is priced at $7.50. It is to be followed shortly by two similar volumes on Specifications and Costs, and Field Practice.

Pipe Replaces Bridges

(*Continued from preceding page*)

burlap bags for head and wing walls; salaries of supervisory personnel, crane operator, and truck drivers; crane and truck hire; and board and room for convict labor paid to the county treasury by the Public Works Department. The most important economic factor in this concrete drainage structure which carries Ferry Road, 6 miles from Springfield, over Turkey Branch Creek, is the elimination of future maintenance costs, and this holds true of the smaller pipe lines also.

Personnel

This construction was done under the personal direction of Capt. F. D. Weitman, Superintendent of Public Works for Effingham County, with headquarters at Springfield, Ga. The substitution of concrete pipe for worn-out wooden bridges got a start in 1944 in Division 5 of the State Highway Department of Georgia which lies along the coastal plain and contains three-quarters of all the wooden bridges in the state. Over 100 of these timber trestles have been eliminated on the state system and with them went the difficult problem of maintenance.

Barber-Greene Dealer

The Hawkeye Machinery Co., 1225 Walnut St., Des Moines 9, Iowa, has been named as central Iowa outlet for the Construction and Industrial Divisions of the Barber-Greene Co., Aurora, Ill., manufacturer of bituminous mixing and paving machines and material-handling equipment. L. C. Johnson is Manager of the new agency, which will handle B-G bituminous mixers, finishers, ditchers, bucket loaders, snow loaders, belt conveyors, and other equipment.

SPEED OPERATION for Snow Plows and Road Machinery with the . . . .

MONARCH *Hy-Rocket* Power Hydraulic Control

Lifts plows ten times faster than hand pump.
Fan-belt driven by truck engine. Cab-controlled.
Easy installation on new or existing equipment.
Priced for the most conservative budget.

MONARCH ROAD MACHINERY COMPANY, 327-329 Front Ave., N. W., Grand Rapids 4, Michigan

Power That Needs No Pampering

Model "VAI," favorite for highway mowing.

Model "SI," [illegible] for sidewalk snowplows.

Model "DI," ideal for mounted loaders.

Model "LAI," suited to heavy cranes, scrapers.

When you want a tractor that thrives on hard work . . . that picks up its load eagerly . . . pulls as much and as steadily at half-speed as wide open . . . that takes but little routine care and goes extra months before major maintenance . . . then you have a place for a Case Industrial Tractor. More than seventy years of building robust outdoor power are back of the extra strength and extra ENDURANCE for which Case tractors are known.

These same virtues, plus staunch stability, make Case Industrial Tractors ideal power-plants for all manner of mounted equipment—cranes and loaders, scrapers and bull-dozers, highway and sidewalk snowplows, rotary brushes, winches, highway and airport mowers. Case Industrial Tractors are built in four basic sizes, as shown, with varying wheel and tire equipment to cover an unbroken weight range from 2500 to more than 10,000 pounds. For complete information call your Case distributor.

CASE

In Business to Serve You. Your Case industrial distributor is located and equipped to supply complete service not only on Case tractors and engine units, but on related equipment. His lines are selected and his personnel is trained with your local conditions and requirements in mind. Take advantage of his varied experience in power and equipment applications. J. I. Case Co., Racine, Wis.

Trans-Bay Traffic Needs Second Bridge

The post-war post-gas-rationing era in the San Francisco area has so increased automobile traffic that local civic and governmental agencies are asking the California Toll Bridge Authority to make a thorough study to determine the need for a second bridge across the Bay at San Francisco. Traffic over the bridge increased from 2,070,574 to 2,129,791 vehicles from August to September, while bus passengers decreased by about 100,000, and train passengers dropped over 200,000.

Oakland and Alameda County officials have sought the aid of the Authority in alleviating congestion that developed immediately following the end of gas rationing. The San Francisco Board of Supervisors offered five suggestions to the Authority to improve existing bridge service as follows:

1. Additional toll-gate facilities for eastbound traffic.
2. Segregation of toll gates for trucks and busses on the lower deck.
3. Extension of the First Street ramp to take westbound traffic overhead beyond First Street; traffic would regain the street level between First and Fremont Streets.
4. An additional ramp to channel westbound traffic into Third Street.
5. Construction of an elevated Y-shaped intersection at Fifth and Harrison Streets to divide the present off-bridge traffic.

Michigan Roads Improved

Special maintenance projects carried out during the past summer and autumn resulted in the improvement of one-fourth of the state's 9,400-mile trunkline highway system, the Michigan State Highway Department has reported. Special resurfacing and patching work amounted to over $3,000,000 of a total expenditure of $10,500,000. One-eighth of the nation's war goods was produced by Michigan and moved over state roads, the Department said, indicating the extent of wear on the highways.

The special maintenance work included resurfacing 778.5 miles of gravel roads with 461,060 tons of gravel; improving 78 miles of pavement with a 2-inch layer of asphalt; and surfacing 885.7 miles of roads of all types with bituminous material. Concrete patches were placed in stretches of pavement totaling 637 miles. Pavement patching required 102,000 square yards of concrete, while the bituminous surface treatment used 204,400 tons of aggregate and 4,514,000 gallons of tar and asphalt. Asphalt resurfacing necessitated the use of 100,671 tons of asphalt.

Manhattan Rubber Alters Its Pittsburgh District

Territorial changes recently effected by the Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., include the expansion of the territory covered from the Pittsburgh branch office to include a large portion of Ohio, the eastern panhandle of West Virginia and several northern counties of Maryland, as well as Pennsylvania.

To be known in the future as the Central Division, the branch is under the management of R. C. Rice, assisted by J. B. Anderson, who succeeds the late Stanley J. Waechter. Joseph Hoffman has been named to represent the firm in southern Pennsylvania and northern West Virginia.

CLEAR THE CONSTRUCTION SITE with International Diesel TracTracTors. They have the power—at low cost—to get the job done quickly. With 'dozer blades or land-clearing tools they root out trees, stumps and undergrowth, and clear away rocks or debris.

Put Internationals to work on homesite tracts, highway right-of-ways, bridge approaches, dam sites, airport locations or wherever there's work to do. And watch how they dig in and get things done! International Tractors are dependable because of their instant-starting, efficient, *full Diesel* engines. They stand up under heavy punishment and continuous service because of their rugged construction and excellent weight-to-horsepower balance.

Yes Sir! Add up the features of International's engine, tractor construction, track-frame design, power transmission, lubrication and controls. The sum is *peak performance*. Isn't *that* what you want on your jobs?

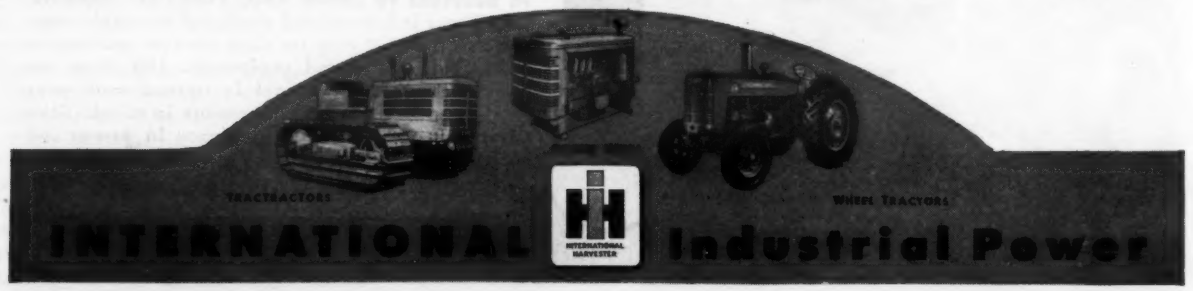
Invest your tractor money in Internationals. It's money saved! That's why more and more discriminating operators are putting International Tractors on the important jobs.

Talk with the International Industrial Power Distributor near you for additional information about International Tractors, Engines, Power Units and allied equipment.

Industrial Power Division

INTERNATIONAL HARVESTER CO.

180 N. Michigan Ave. Chicago 1, Illinois



Worthington-Ransome Blue Brute Distributors

See ad on page 69 for list of equipment in each line

Worthington-Ransome Distributors

Ala., Birmingham, J. D. Pittman Tractor Company
Colo., Denver, Power Equipment Company
Fla., Orlando, High Equip. & Supply Company
Tampa, Epperson & Company
Ga., Atlanta, Tractor & Machinery Company
Ida., Boise, Olson Manufacturing Company
Ill., Chicago, Chicago Construction Equipment Co.
Maine, Portland, Maine Truck-Tractor Company
Mich., Muskegon, Lakeshore Machy. & Supply Co.
Minn., Minneapolis, Philippi-Murphy Equip. Co.
Mo., Clayton, The Howard Corporation
Montana, Billings, Interstate Truck & Equip. Co.
Helena, Caird Eng. Works
N. Y., Albany, Milton-Hale Machinery Company
New York, Hodge & Hammond, Inc.
New York, Railroad Materials Corporation
N. D., Fargo, Smith Commercial Body Works, Inc.
Okla., Oklahoma City, Townsco Equip. Company
S. C., Columbia, Smith Equipment Company
Tenn., Knoxville, Dempster Bros., Inc.
Vt., Barre, A. M. Flanders, Inc.
Va., Richmond, Highway Machinery & Supply Co.
Wisc., Milwaukee, Drott Tractor & Equip. Co., Inc.

Ransome Distributors

Ariz., Phoenix, Lee Redman Company
Ark., Little Rock, Kern-Limerick, Inc.
Calif., Los Angeles, Garlinghouse Bros.
Conn., New Haven, W. I. Clark
Waterbury, Contractors Supply Company
D. C., Washington, M. A. Doetsch Mach. Company
Ga., Savannah, Morgans, Inc.
Ill., Chicago, Thomas Hoist Company
Ind., Fort Wayne, American Steel Supply Co
Ky., Paducah, Henry A. Petter Supply Company
La., New Orleans, Ole K. Olson Company
Md., Baltimore, Stuart M. Christhilf & Company
Mich., Detroit, T. G. Abrams
Miss., Jackson, Jackson Road Equip. Company
Mo., Kansas City, Brown-Strauss Corp.
Neb., Lincoln, Highway Equip. & Supply Co.
N. J., Newark, Johnson & Dealaman
N. C., Raleigh, Smith Equip. Company
O., Cleveland, H. B. Fuller Equip. Company
Pa., Philadelphia, Giles & Ransome
Wilkinsburg, Arrow Supply Company
Tex., El Paso, Mine and Smelter Supply Company
Houston, McCall Tractor & Equip. Company
San Antonio, San Antonio Mach. & Supply Co.
W. Va., Charleston, Clyde P. Beckner, Inc.

Worthington Distributors

Ark., Fort Smith., R. A. Young & Company
Little Rock, R. A. Young & Son
Calif., San Francisco, Coast Equip. Company
Colo., Denver, John N. Meade
Conn., Hartford, The Holmes-Talcott Company
Ill., Chicago, John A. Roche
Ind., Indianapolis, Reid-Holcomb Company
Iowa, Des Moines, Electric Eng. & Const. Co.
Ky., Harlan, Hall Equipment Sales Company
Louisville, T. C. Coleman & Son
Louisville, Williams Tractor Company
La., New Orleans, Wm. F. Surgi Equip. Company
Md., Baltimore, D. C. Elphinstone, Inc.
Mass., Cambridge, Field Mach. Company
Mich., Dearborn, Thomas G. Abrams
Detroit, W. H. Anderson Co., Inc.
Flint, Gransden-Hall & Company
Minn., St. Paul, D. L. O'Brien
Mo., Kansas City, Mach. & Supplies Co.
St. Louis, W. H. Reaves
N. J., Hillside, P. A. Drobach
No. Bergen, American Air Compressor Corp.
N. M., Albuquerque, Bud Fisher Company
Roswell, Smith Machinery Company
N. Y., Buffalo, Dow & Co., Inc.
New York, Air Compressor Rental & Sales
Olean, Freeborn Equip. Company
N. C., Raleigh, Caroline Tractor & Equip. Co.
O., Cleveland, S. M. Clancey
Cleveland, Gibson - Stewart Company
Marietta, Northwest Supply & Equip. Co.
Toledo, M. W. Kilcorse & Company
Oregon, Portland, Andrews Equip. Service
Pa., Allentown, H. N. Crowder, Jr., Inc.
Easton, Sears & Bowers
Harrisburg, American Equip. Company
Oil City, Freeborn Equipment Company
Philadelphia, Metalweld, Inc.
Pittsburgh, Atlas Equip. Corp.
Wilkes-Barre, Ensminger & Company
Tenn., Knoxville, Wilson-Weesner-Wilkinson
Tex., Dallas, Shaw Equip. Company
El Paso, Equip. Supply Company
Houston, Dye Welding Supply Company
San Antonio, Patten Machinery Company
Wash., Seattle, Star Machinery Company
Spokane, Andrews Equipment Service
W. Va., Fairmont, Interstate Engineers & Constr., Incorporated
Wyoming, Cheyenne, Wilson Equip. & Supply Co.

Buy Blue Brutes

Worthington Pump and Machinery Corp.
Worthington-Ransome Construction Equipment Division
Holyoke, Massachusetts

Keep On

BUYING BONDS

★ ★ ★ ★

DON'T SKIMP!

Ceco welded wire fabric is placed in the concrete slab on the O'Connor Construction Co. highway project near Bloomington, Ill. This fabric, consisting of small square closely spaced members electrically welded at the intersections of the transverse and longitudinal wires, weighs 25 to 56 pounds per 100 square feet.

AGC Directors Study Many Vital Problems; Nominations for 1946

Labor problems, wage stabilization, material shortages, the creation of a stable annual construction volume, and many other problems were discussed by the Governing and Advisory Boards of the Associated General Contractors of America at their fall meeting in Chicago.

The group voted that, so long as the Federal government exerts price control over construction operations, some form of wage control should be continued, such as that of the Wage Adjustment Board for construction. Thorough discussion of government and industrial policies relative to wage stabilization and the proposed ways of achieving it featured the session. Past President E. P. Palmer, New York City, who represented the industry at the national Labor-Management Conference called by the President, was given a group of recommendations drawn up by the AGC Labor Relations Committee, of which Carl Jansen, Pittsburgh, is Chairman:

Considering the trend towards higher construction costs, the group felt that prices should be held down as much as possible; that the awarding authorities and the public should be informed that some increase in construction costs is reasonable and justified; and that the industry should do everything possible to assure adequate bidding on all projects advertised, particularly to discourage any tendency towards undertaking the work by day-labor methods.

Attempts to regulate the amount and tempo of new construction were looked upon with disfavor in the discussion that followed a report by the Legislative Committee, F. W. Parrott, Chairman, relative to proposals for stabilizing the industry's annual volume. The consensus was that construction fills a definite need in the national economy; therefore it is highly inadvisable to attempt Federal controls on the meeting of these needs.

The Market Development Committee, headed by Fred I. Rowe, Columbus, Ohio, recommended against attempting to set up an overall system for encouraging or discouraging the immediate start of particular types of construction. Instead, contractors should use their influence locally to see that projects are taken up in orderly fashion, according to urgency.

Much of the blame for material shortages was placed on the Office of Price Administration's regulations. The group voted to ask the OPA "to take a practical and realistic approach towards the cost and price situation so far as it affects the manufacture of these building materials, in order to insure that production in required volume will occur". Should it become necessary to resort to a Congressional investigation to achieve this result, the meeting voted to seek such action.

The association and its branches "wish to offer their cooperation to architects, engineers, and awarding bodies generally in an effort to accomplish such savings as may be shown after a full discussion and understanding of the problems involved," the Specifications Committee report stated. Presented by Leo P. Richardson, Detroit, Chairman, it was adopted. Subcommittees were set up for building, highway, and heavy types of construction.

The Municipal Contractors Association of Texas, and the Tacoma Chapter, Washington, were accepted as chapter members. Their admission raises the number of AGC chapters to 92, and the total membership to over 3,300.

The present Vice President, Warren S. Bellows, President of the W. S. Bellows Construction Co. of Houston, Texas, was nominated for the presidency in 1946. Harry A. Dick, head of the Gilpin Construction Co. of Portland, Oreg., is the incumbent. Forrest W. Parrott, Vice President of the C. F. Lytle Co., Sioux City, Iowa, is the nominee for Vice President. Elections will be held during the 27th Annual Meeting, February 18-21, at the Stevens Hotel, Chicago.

New Blaw-Knox Executive

Arthur A. Levison has been named Vice President of the Blaw-Knox Division in charge of the construction equipment department of the Blaw-Knox Co., Blawnox, Pa. Associated with the firm since 1923, Mr. Levison is well known in the highway construction field. Before joining Blaw-Knox, he was a highway engineer with the Public Roads Administration.

AIR POWER THAT BEATS SCHEDULES

On those jobs you win with a sharp pencil, there's no room for compressors and air tools that waste air or have a habit of quitting at the wrong time. Avoid interruptions and air-power losses by using Blue Brutes.

Let's take a 315′ Blue Brute Portable Compressor, for example. You'll like the way light, tight, quiet Feather* Valves help squeeze the most air out of each gallon of fuel . . . the way special unit coupling in 3-point suspension cushions engine and compressor against vibration, shocks, distortion . . . the way the smooth-running Diesel or gasoline engine drives the compressor. And especially will you like the way it powers such air tools as Rock Drills, Paving Breakers, and Wagon Drills.

If you don't know it already, it will pay you now to investigate why a Blue Brute air-power team beats construction schedules and keeps costs low by saving hours and dollars by speeding up the work. You'll find, as others have before you that in construction equipment *there's more worth in Worthington.*

*Reg. U. S. Pat. Off. H5-13A

KNOW YOUR BLUE BRUTES

Your Blue Brute Distributor will gladly show you how Worthington-Ransome Blue Brute construction equipment will put your planning on a profitable basis and prove that *there's more worth in Worthington.* Act now! His name is listed on page 68.

RANSOME EQUIPMENT

Blue Brutes include: Pavers, Concrete Spreaders**, Concrete Mixers, Concrete Placing Equipment, Big Mixers, Finishing Machines**, Pneumatic Placing & Grouting Equipment, Truck Mixers, Plaster & Bituminous Mixers, and related equipment.

WORTHINGTON EQUIPMENT

Blue Brutes also include: Diesel, gasoline and electric driven Portable Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs; Rock Drills and Air Tools in a wide range of weights and sizes; Contractors' Pumps**.

**To be announced

Get more WORTH from air with WORTHINGTON

BUY BLUE BRUTES

Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass.

For 69 Years Builders of Fine WHEEL BARROWS: AMERICAN STEEL SCRAPER CO. Sidney, Ohio Watch for Post-War Models

State Highway Dept. Contracts for Design

The Pennsylvania Department of Highways has just awarded a second contract to Gannett, Fleming, Corddry & Carpenter, Inc., Engineers of Harrisburg, Pa., to survey, design, prepare specifications, and contract for 15 miles of 4-lane high-speed boulevard in western Pennsylvania. The highway will have no grade crossings and will have a 3 per cent maximum grade, and 3-degree maximum curvature, similar to the Pennsylvania Turnpike, of which it is a branch. The estimated cost of the project is about $5,000,000.

This highway, together with a 25-mile section for which these engineers have just completed the design, will make possible the letting of contracts for 40 miles of high-speed road from the Pennsylvania Turnpike near Greensburg, Pa., to join the National Pike, U. S. 40, at Washington, Pa., by-passing Pittsburgh.

Be wise—hold your War Bonds.

Colonel Kittrell Given Upper Mississippi Post

Colonel Clark Kittrell, U. S. Corps of Engineers, has been assigned as Division Engineer of the Upper Mississippi Valley Division, succeeding Colonel Malcolm Elliott, who has retired from the service. Colonel Kittrell is a member of the Board of Engineers for Rivers and Harbors, and has recently been appointed as a member of the Mississippi River Commission.

A graduate of West Point, Colonel Kittrell received his degree in civil engineering from Massachusetts Institute of Technology in 1923. He has served as Division Engineer for the Middle Atlantic and Great Lakes Divisions, District Engineer at Vicksburg, Fort Peck, and New Orleans, and assistant to the District Engineer at Louisville. He was Engineer-in-Charge of construction at Fort Peck Dam. The Colonel has seen service in Hawaii, Panama, North Africa, Italy, France, the Middle East, and only recently returned from Cairo, Egypt.

MORE POWER and REAL STRENGTH *HERE—*

. . . Mean Continuous Operation and Longer Life *on the job—*

No Adnun Blacktop Paver was ever a "one-job" machine . . . some of the oldest models are still paving—and the new, faster and more powerful Adnuns are built to take the shocks and strains of high production paving without structural or power failures that hold up paving—make cheap equipment an expensive investment in the long run. Adnun construction puts strength where it is needed in a heavy, cross-braced frame; provides insurance against out-of-line drive elements; and gives you the power to handle the heaviest trucks efficiently on any normal highway grades.

Adnun "Feathertouch" Hydraulic Controls, Power Cut-Off, Four-Wheel Drive, Continuous Course Correction, and versatility in paving to specifications under any job conditions are features that help to make long, dependable Adnun service *profitable* service for you.

There is a complete new catalog on Adnun Blacktop Pavers ready to be mailed at your request. Write for it today.

THE FOOTE COMPANY, Inc.
1916 State Street • Nunda, N. Y.

ARMY (E) NAVY
Three Army-Navy "E" Awards for The Foote Company!

ADNUN
TRADE MARK REGISTERED
BLACK TOP PAVER

New Officers Elected By Southeastern Assn.

State Highway Officials of 12 States Hold Meeting in Atlanta: Highlight Is Discussion of Equipment Needs And Surplus Property Disposal

✦ AT the fourth annual meeting of the Southeastern Association of State Highway Officials held in Atlanta, Ga., on December 3 and 4, C. S. Mullen, Chief Engineer of the Virginia Department of Highways, was elected President for the coming year, and George T. McDonald, State Highway Engineer of Georgia, was elected Vice President. They succeed, respectively, Ernest L. Bailey, Commissioner of the West Virginia State Road Commission, and G. R. Swift, Director of the Alabama State Highway Department in 1944.

Nearly 300 delegates from the twelve states of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia attended the two-day session which had been skipped last year because of a ruling from the Office of Defense Transportation regulating travel in wartime. The various committee meetings were well attended, and keen interest was taken in the papers submitted, even though several of them had been written for the postponed meeting of a year ago, and had since been published in the Proceedings of the Association.

One of the liveliest discussions arose out of a Committee on Administration forum relative to securing surplus war equipment for state highway departments. The unanimous opinion of the members of this committee on obtaining surplus Army equipment, such as badly needed trucks, power graders, and tractor-dozers, was that quick action is needed to compel the Army to release this hoard of equipment in order to relieve the dangerous scarcity of such items existing in highway departments since the war. Several members told of the experiences that they had in trying to get this equipment out of Army warehouses and into use.

Surplus Army Equipment

One member reported success in obtaining 3,000 to 4,000 tires, a few weapon carriers, and 21 field ambulances. The two types of vehicles are to be used for survey parties. The crying need for trucks, however, has gone unanswered, with only four being secured up till now. On October 12, this engineer visited a surplus-truck area with the commanding general, picked out what he wanted, and submitted a purchase order. His next information was that all the equipment at this yard was sold on October 23 at public auction, and when he made inquiry as to what happened to his purchase order he was told it must have been lost. He feels with disgust that "somebody is paying off somebody", and that efforts are made to pacify highway departments by telling them that material and equipment will soon be released from warehouses, but his state needs trucks right now.

Another official said that his men were not even permitted to inspect equipment that they wanted to buy, and that after trying for three months all they were able to get were some welding sets. They always seemed to be ten days too late, according to the surplus-property custodians. He emphasized that the only relief for their equipment needs for the coming year is from surplus Army stocks.

Still another representative stated that his department got a chance to look at a collection of 3,000 tires, but only about one-third of that amount was of sizes that could be put to use. They were told that they would have to take them all or none. Since the state is in no position to sell those tires which could not be used, the deal fell through.

A fourth delegate felt that even if only a small percentage of the total of Army surplus equipment, specially trucks, could be procured, it would be a big help to highway departments. He hinted his suspicions of the trucking industry's influencing the Army to keep it from releasing surplus trucks.

A different viewpoint was taken by another member who blamed the Army, saying that it never wants to let go of anything it has its hands on, and that depots throughout the country are

(*Concluded on next page*)

Heil
Hi-Speed
Cable Scrapers
"bite deep"
to give you bonus loads
Heil Cable-operated Bulldozers and Trailbuilders are rugged, fast-operating, and perform dependably.
Heil Tamping Rollers are designed and built to give you a highly satisfactory tamping action.
Heil Hi-Speed Bottom Dump Wagons have high
Positive down-pressure on the cutting blade insures rapid soil penetration and faster digging action in any kind of dirt. These units really "bite deep" to give you a heaped 15-yard load in 40 to 50 seconds.
Fast acceleration and high travel speeds enable your operators to cut round-trip time and secure top operating efficiency, particularly on long hauls.
At the fill, this famous Hi-Speed Scraper spreads its load with a positive mechanical push-out action secured by tilting the floor. This fast-action discharge is accomplished by a leverage action which exerts a low line pull on the unloading cable. The cutting blade remains in a fixed position in relation to the sides of the bowl and does not tilt with the dumping floor. Thus the load can be spread at any desired height, and at travel speeds permitted by the grade.
Ask your Heil distributor for the details. Specify "Heil" on all dirt-moving equipment and be assured of fast, profitable dirt-moving at low cost per yard.
R-50.
THE HEIL CO.
GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

Simplex—the World's Most Complete Line of Jacks
Lever—Screw—Hydraulic
On every construction task it's easier and safer to lift, lower, push or pull with Simplex Jacks.
Templeton, Kenly & Co.
Chicago 44, Ill.
Simplex
LEVER SCREW HYDRAULIC
Jacks
Send for complete catalog

THE RUD-O-MATIC TAGLINE
Spring Tension—Less Wear

Maintains positive tension at all times sufficient to steady a clam shell bucket under any conditions. Functions perfectly with boom at any angle.

Operates on a spring principle. There are no weights, tracks, pins or carriages to wear out or get out of order. Large bearing and fewer sheaves save wear on cable.

Tagline is complete with fairlead and cable attached. Can be installed in less than one-half hour.

Most Crane Manufacturers have adopted Rud-o-Matics as standard equipment

New Officers Elected By Southeastern Assn.

(*Continued from preceding page*)

stuffed full of equipment and material. He has even assigned a special agent, who had formerly worked with the Army on this surplus equipment, to see if he could untangle the red tape, but the results have been negligible. They have managed to purchase a few thousand tires, mostly used or rebuilt but in good shape, at an average cost of $3 apiece. In July an order was placed for 100 trucks but only 30 have been obtained to date. This state in the past purchased an average of 400 trucks a year to take care of replacements, but since Pearl Harbor it has been able to buy only three. The head of this highway department favors a Senate Investigating Committee to throw light on the subject. To ease the situation, he suggested that orders from highway departments for trucks, when purchased through the regular channels, not be included in dealers' quotas, thereby facilitating speedier delivery.

An eastern representative of the Truck Manufacturers Association who was present said he was more optimistic about the delivery of trucks than passenger cars, but felt that the best thing was a system of rationing for trucks, with public agencies getting the first priority.

Informal Dinner

At an informal dinner of the entire association, Governor Ellis Arnall of Georgia expressed some apprehension, which was also felt by several highway department heads, as to whether sufficient contractors, materials, equipment, and men would be available for the coming highway construction program, which is scheduled to spend $1,000,000,000 over the next three years in the southeast. The session was concluded with an address by Charles M. Upham, Engineer-Director of the American Road Builders' Association, who urged highway departments to make use of the Federal money now available; otherwise future appropriations will be even more difficult to obtain. He advocated an increase in the salaries of highway engineers in order to attract more and better talent, for in some states a lack of engineering personnel is retarding the construction program. He also told the meeting to expect an increase in the cost of highway construction as future roads will be better but more expensive; that labor is uncertain in amount, quality, and costs, and will probably remain so for some time; and that materials, equipment, and contractors' profits will also most likely be high. Upham cautioned engineers to base their estimates of highway construction costs on present, not depression, prices.

Road Dust Damages Fruit Trees, Tests Show

Dust is an adverse factor in the production of healthy fruit, according to recent technical research on the contamination of crops, John A. Long, Manager of the County Highway Officials' Division of the American Road Builders' Association, told a recent meeting of the group. Tests indicate that fruit trees growing near untreated farm-to-market routes are highly susceptible to diseases and parasites in spite of careful spraying, he pointed out, urging that "this is one more reason for the immediate improvement of our secondary roads".

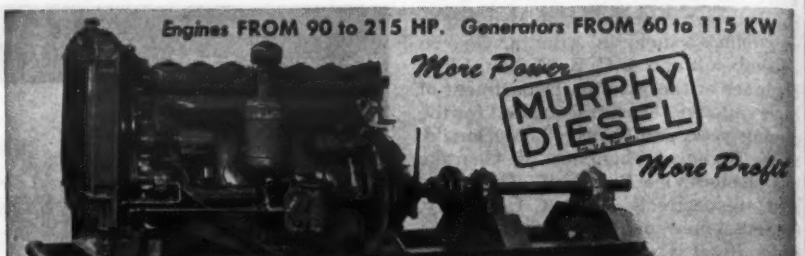
Discussing the needs of the nation's secondary-road system, Mr. Long emphasized that these roads serve 6,000,000 farms having an annual production valued at $12,000,000,000. Getting the farmer's produce to the consumer as quickly as possible is vitally important if the economic picture is to be maintained, and it depends on the condition of the highway. If a farmer 10 miles from town has to traverse a one-mile unpaved stretch, this section, if impassable, maroons him as effectively as if the entire distance were unpaved.

Care should be exercised by highway officials when selecting the type of surface to be used, Mr. Long said. The cost of such work is naturally in direct ratio to the volume of traffic. Gravel, slag, crushed stone, and other local materials may be advantageously used in much county road building. In such cases the engineer can make an excellent contribution to the vehicle operator, the taxpayer, and the resident along the road, by choosing materials which will blend into a dense, hard, smooth surface with a minimum of machine manipulation. Such construction would be the initial step for any type of pavement that might follow.

Heads New Gar Wood Unit

Leon C. Hulse has been named Manager of a new plant at Mattoon, Ill., for the manufacture of road machinery and heavy-duty truck bodies, Gar Wood Industries has announced. Mr. Hulse was head of the firm's termination department until his assignment in the Road Machinery Division.

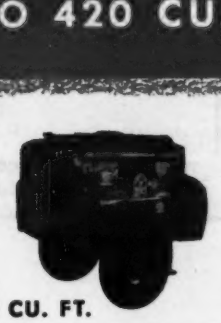
Forty Gar Wood machines were included in the equipment used in constructing the Tennessee atomic-bomb plant, the firm reports. The J. A. Jones Construction Co. used 9 Model 400 scrapers, 3 Model 515, 2 Model L12, 4 Model 520, 4 Model S8, and 4 Model RCX trailbuilders. Six 400's and 3 S8 scrapers were used by the Stone & Webster Construction Co., while Roane & Anderson had 3 of the 400's and 3 Model 515 scrapers.



MURPHY DIESEL COMPANY, 5319 W. Burnham St., Milwaukee 14, Wis.

Run your eye over this wide range of
SCHRAMM
AIR COMPRESSORS
SIZES FROM 20 TO 420 CU. FT. ACTUAL AIR

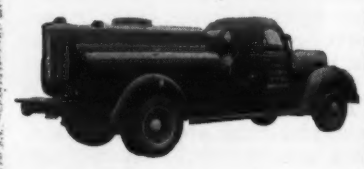
No. 20
ON SHOP TRUCK
The No. 20 compressor is a complete self-contained unit available in various types of mountings and with an actual air delivery of 20 cu. ft. per minute.


60 CU. FT.
DE LUXE WITH TOOL BOXES
The two wheel trailer type mounting is designed for rapid and inexpensive transportation behind truck or car.

105 CU. FT.
WITH SWIVEL TYPE WHEEL
This trailer type mounting is provided with a universal coupling or towing ring for connection to car or truck for hauling at maximum towing speed.

105 CU. FT. WITH STREAMLINE FUEL TANK
A pneumatic tired mounting used generally for rapid transit over town and country highways. Lighter weight and better balance provide easier handling.

210 CU. FT.
STANDARD SKID MOUNTED
This unit is easily loaded on to a motor truck body for temporary use or for transportation, and can also be used for temporary or permanent stationary installation without addition of foundation.


210 CU. FT.
MOTOR TRUCK MOUNTING
Any of the Standard self-aligned Schramm compressor units complete with streamline tool box and built-in fenders are available for mounting on truck chassis.

315 CU. FT.
ON SPRING TRAILER
The Spring Trailer, with pneumatic tires and semi-elliptical springs front and rear, is equipped with an automotive type steering assembly to provide perfect balance on any and all turns.

STEEL WHEEL MOUNTING
All size Schramm compressors are available in this type mounting with heavy, wide steel rims for easy portability in tough terrain.

420 CU. FT.
DIESEL ENGINE DRIVEN
Schramm Diesel Engine Driven units are available in sizes ranging from 105 to 420 cu. ft. of free air.

SCHRAMM INC.
COMPRESSOR SPECIALISTS
WEST CHESTER
PENNSYLVANIA

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

State Held Responsible For Readiness of Site

The courts frequently have declared that a state or other public authority is not entitled to have its contracts for construction of public improvements interpreted more liberally in its favor than if it were a private corporation or individual. As aptly stated by the Indiana Supreme Court (State v. Feigel, 178 N. E. 435): "There is not one law for the State, and another for its subjects. When the State engages in business and business enterprises, and enters into contracts with individuals, the rights and obligations of the contracting parties must be adjusted upon the same principles as if both contracting parties were private persons. Both stand upon equality before the law."

Upholding a judgement in favor of a highway contractor for damages resulting from idleness of his crews, equipment, etc., due to a delay by the State in having the site ready, before he was ordered to proceed with his work, the Supreme Court said:

"The plainest principles of justice require the implication of a covenant on the part of the State to provide a right-of-way so as to enable" the contractor "to prosecute his work to the utmost advantage and economy. Any other construction [interpretation] would destroy the mutuality of the agreement, and put it practically in the power of the State to defeat performance by the contractor. It is true that the contract does not expressly state that" the State "shall furnish the right-of-way, nor does it fix any definite time when the same should be acquired; but the clearest implication arises from the language of the agreement and its avowed object and interest that the right-of-way over which the proposed highway was to be constructed should be secured by the State. This position is further fortified by the provisions of the state highway law, which * * * lays down the method and procedure by which the State can secure such a right-of-way."

The court cited what a New York judge had declared in a similar case (Schunnemunk Construction Co. v. State, 189 N. Y. Supp. 569): "If an individual in good faith believed that he was the owner of land, and contracted with a builder for the construction of a house upon it, and during the progress of the work discovered that he had no title, and interrupted the performance by his builder of the erection of the structure, he would be liable for the damage caused. * * * The situation is no different here."

Damage Claim Was Not Waived

In the same case, the Indiana Supreme Court decided that the contractor did not waive his right to damages on account of being delayed in performing his contract, through having fully performed the work and accepted payment therefor. The court noted that the contractor was not seeking to recover pay for work done, in addition to the payment received, but "is seeking to recover damages for a breach of the contract, which he is not precluded from doing because he accepted the consideration agreed upon in the contract should be paid him for the construction of the highway".

Provision for Time Extension

The State also claimed that a provision in the contract for extending the time for performance afforded the contractor an exclusive remedy when the State failed to provide the site in due time. But the court replied: "This might be true if the delay was caused without fault of either party, but it certainly would not be true where the delay was caused by the public body without right." (Citing a decision of the United States Supreme Court.)

State Was Contracting Party

The State sought to avoid liability on the further ground that condemnation of land for a highway site involved action by the State Attorney General and the courts, over whom the Highway Commission, which awarded the contract, had no control. Therefore, it was argued that the Commission could not be held accountable for delays caused by the Attorney General or the courts. The Supreme Court, overruling the argument, pointed out that "the State is the contracting party, not the Highway Commission, that the Commission and the Attorney General are the agents through whom the State acts." The court added: "We could not say that the activities of government officials such as are here involved"—in condemning land—"when assisting the State in performing a duty imposed upon the State by an ordinary business contract, would be such as to bring" the State "within the rule which precludes recovery on the ground that it was engaged in the performance of a *governmental function.*"

When Motorists Collide With Equipment on Road

Although, by statutory provision, road contractors are exempt from compliance with state traffic regulations, while conducting operations, that does not relieve them from obligation to use reasonable care to avoid injury to travelers lawfully using a road under construction.

The Minnesota Supreme Court had occasion to consider the legal responsibility in such instances, in a case where a car, traveling on the right side of a black-top highway at low speed collided with a pavement sweeper operated by a contractor's employee. The approaching sweeper was concealed by a cloud of dust, which, apparently, was created by the sweeper.

In the motorists' suit for damages, the trial court ordered a jury to exonerate the road contractor, and the motorists appealed to the Supreme Court. Although the latter tribunal fully recognized that the car driver was bound to use reasonable care, commensurate with the circumstances, for his own safety and that of his fellow passengers, the court ordered a new trial, on the ground that it was for the jury to determine whether or not the direct cause of the accident was the road contractor's failure to take proper measures to prevent such an accident as occurred. (Hockenhull v. Strom Construction Co., 2 N. W. 2d, 430.)

Said the Supreme Court, in part: "If, in the operation of the sweeper, production of dust and presence upon the wrong lane of the highway were essential phases of performing the contract, a jury could properly hold defendant to *reasonable foresight as to how such operations would affect motorists lawfully upon the highway.* Defendant's

(*Concluded on next page*)

GRIFFIN

GRIFFIN

WELLPOINT SYSTEMS

JETTING PUMPS

FOR SALE RENT

Prompt Shipments

Send for our New 60 page illustrated catalog "GRIFFIN POINTED WELLPOINT FACTS" chock full of latest information on Wellpoint Systems for dewatering, emergency and permanent water supply systems, also information on pressure pumps and data for jetting.

GRIFFIN WELLPOINT CORP.

881 EAST 141st ST. • NEW YORK 54, N. Y.

Phones: MElrose 5-7704-5-6

Here's teamwork FOR YOUR *earth moving jobs*

GAR WOOD ROAD MACHINERY WITH ALLIS-CHALMERS DIESEL POWER

The experience of successful contractors and public construction officials has shown that it takes teamwork to get earth moving jobs done on time and at lowest cost. When your operators and equipment work together with you as a team, you have a really unbeatable combination.

In organizing such a team, a logical place to start is with your equipment. Gar Wood Road Machinery and Allis-Chalmers Diesel Tractors are already "teamed up" for high efficiency operation because they are engineered and built to work as a team. And this dependable, proved equipment wins the enthusiastic cooperation of operators because it gets jobs done with the least effort and the utmost convenience and speed.

You benefit too by the nation-wide service of the strong Allis-Chalmers and Gar Wood factory organizations through your local dealer—always helpful service that keeps your equipment going. Get this teamwork on your jobs. Order Gar Wood Road Machinery now from your Allis-Chalmers dealer.

Hydraulic Dozecaster

GW ROAD MACHINERY is Sold Through ALLIS-CHALMERS Dealers Everywhere

ROAD MACHINERY DIVISION

GAR WOOD INDUSTRIES, Inc.

DETROIT 11, MICHIGAN

OTHER PRODUCTS OF GAR WOOD INDUSTRIES INCLUDE HOISTS AND BODIES • WINCHES AND CRANES • TANKS • HEATING EQUIPMENT • MOTOR BOATS

Avoid Legal Pitfalls

(*Continued from preceding page*)

complete reliance upon the ingenuity and agility of the particular motorist to escape any danger may not have been entirely proper. Certainly the lot of the motorist who tried to avoid the consequences of this collision was not an enviable one. To his right was a ditch too deep to be inviting. To his left, for all he may have known under prevailing conditions of visibility, other cars could have been driving" in the opposite direction on their right side of the road, "And even in order to take this dubious way out, plaintiffs were required to cross a sizable (though not as large as they estimated) ridge of gravel. Under those circumstances a reasonable motorist might have believed that his only chance of escape was to stop and hope that the operator would see him. And that failure of detection may be attributed to the *inadequate precautions taken by defendant to warn, direct, or assist those foreseeable in the position of plaintiffs.* Clearly, the defendant may not hide behind the rule of the highway department permitting travel on this road to shift to plaintiffs the whole responsibility for having brought themselves in a position of risk."

Government Engineer Arbiter on Subcontract

A subcontract for the construction of a fume-exhaust system at the Sunflower Ordnance Works was the subject of litigation in a case decided by Judge Murrah of the United States District Court for Kansas. The subcontractor sued for damages for supposed breach of the subcontract, and the prime contractors counterclaimed recovery on account of overpayment. Judge Murrah decided the case against the subcontractor. (Stiers Bros. Construction Co. v. Broderick et al., 60 Fed. Supp. 792.)

The principal points decided in the case pertain (1) to the scope of authority granted by the subcontract to Government engineers to determine disputes arising under it; (2) the effect of elimination of part of the originally contemplated work; and (3) the right of the prime contractors to recover an overpayment. Decisions on these points were based on the following grounds:

1. The subcontract provided, in substance, that if the parties themselves could not solve any dispute arising out of the work, it should be submitted to the Contracting Officer (Government Engineer) and that his decision should be final, subject to appeal to the Chief of Engineers. The court decided that, under this clause, the Chief's decision, on appeal, that certain work had been deleted by mutual agreement due to lack of equipment was binding upon the parties and the courts, in the absence of proof that the decision was prompted by fraud or gross error.

2. The contract provided for an "equitable adjustment" in case of an "enforced change" in the subcontract work. The court decided: "If the plaintiff [subcontractor] was entitled to an equitable adjustment by reason of the elimination of the tunnel work, that adjustment, under the definition, would have to be based upon its own probable costs and the reasonable profit, if any, for boring the tunnel with its own labor and equipment." So, even if the subcontractor had been entitled to damages on account of the eliminated work, it was not entitled to recover without first proving probable costs and reasonable profit since "profit is not to be presumed". Performance of the eliminated work *might* have entailed a loss to the subcontractor. However, elimination of the work by mutual agreement due to lack of equipment did not constitute an "enforced change", and therefore the provision for an "equitable adjustment" did not apply. The court's decision was also influenced by the fact that the subcontract provided for payment on unit prices and permitted variation in quantities from 50 to 150 per cent. More than 50 per cent of the work originally contemplated was done and paid for.

3. The contract provided that final payment under the contract could not be reopened for correction or deduction, except on a showing of collusion, fraud, or "obvious error". The court decided that the prime contractors' oversight in failing to charge the subcontractor with work done for it by the contractors was such "obvious error" as to entitle the contractors to reopen the account, and recover the amount of the omitted charge.

Contractors' Employees Under Federal Labor Laws

Whether or not a construction company's janitor and watchman, employed at its central place of business where tools and equipment were stored for use in constructing dams, highway viaducts, and river improvements, was engaged in the "production of goods" for interstate commerce, within the meaning of the wage and hour provisions of the Federal Fair Labor Standards Act, was a question with which the United States Circuit Court of Appeals, Seventh Circuit, wrestled in the recent case of Engebretsen v. E. J. Albrecht Co., 150 Fed. 2d, 602. The court said "yes".

The court decided that the *tools and equipment* used by the construction company in its business of constructing facilities used in interstate commerce and transportation constituted "goods" produced for such commerce, even if the dams, viaducts, etc., constructed could not be regarded as "goods" within the meaning of the Federal Fair Labor Standards Act.

To one not "learned" in the fine distinctions that are drawn by men of the law, it may be difficult to see how a janitor and watchman in such a case bears any substantial relationship to interstate commerce. Such decisions as that above cited are obedient to rulings of the highest court of the land which has put more elastic into labor laws than can be found in women's girdles.

In support of its conclusions, the Circuit Court of Appeals cited decisions to the following stated effect:

The Federal Act covered employees engaged in the abutments and substructures under bridges used by a railroad in interstate commerce. That decision, reached by the United States Supreme Court, reversed a contrary holding by the New York Appellate Division.

Employees engaged on dike and revetment construction on the Missouri and Mississippi Rivers were likewise covered. That conclusion reached by the United States Circuit Court of Appeals, Sixth Circuit, upset a contrary decision rendered by a United States District Court.

The Act also covered workmen who unloaded tools and equipment used in building an ammunition plant for Uncle Sam, so decided the United States Circuit Court of Appeals, Tenth Circuit.

Forming rear wheel discs on a 450-ton press in the Oliver "Cletrac" plant.

This is a pressing matter!

In this huge 450-ton press, many heavy precision parts are formed for Oliver "Cletrac" crawler tractors. Like clockwork, a part is formed every few seconds . . . another example of the modern production methods and equipment that permit Oliver "Cletrac" to build in added quality at no extra cost to the user.

Quality is the keynote that characterizes every Oliver "Cletrac" crawler tractor . . . in design, workmanship, materials and performance . . . quality that means years of dependable, economical service.

Maintenance of this standard enables your Oliver "Cletrac" dealer to offer you the finest in crawler tractors . . . for your every need.

CLETRAC

a product of The OLIVER Corporation

THE OLIVER CORPORATION Cletrac

Shunk Snow Plow and Ice Removal BLADES
Proved record of superior performance. Made of specially developed steel to withstand severe service conditions.
FOR ALL TYPES AND MODELS OF SNOW PLOWS
Various widths, lengths, thicknesses—flat or curved—standard or special—punched ready to fit your machine.
SHUNK SAW-TOOTH ICE BLADE
Amazingly effective. Thoroughly breaks up and removes heavy, slippery ice and snow formations. Replaces all types of snow plow blades or maintenance units. Write for Bulletin and name of nearest Distributor.

Shunk MANUFACTURING COMPANY
ESTABLISHED 1854
BUCYRUS, OHIO.

North Atlantic Highway Officials Curtail Meeting

Because of the severe congestion in the hotels of the large cities along the Atlantic seaboard, the Board of Directors of the Association of Highway Officials of the North Atlantic States has decided again to forego its usual type of convention. In its place a Directors' Conference, similar to the 1945 assembly, will be held at the Hotel Pennsylvania, New York City, February 28 to March 1.

Sessions will be restricted to the members of the Board of Directors, and three or four ranking highway department officials from the member states and the U. S. Public Roads Administration. There will be no exhibits.

Worthington Mower Co. Purchased by Jacobsen

The purchase of the Worthington Mower Co., Stroudsburg, Pa., has been announced by the Jacobsen Mfg. Co., Racine, Wis. Established in 1914, the Worthington firm has specialized in a tractor-drawn gang-type mower for large operations, such as roadside and airfield work.

E. R. Sawtelle, Vice President and Sales Manager for Worthington, will continue to direct the firm's sales. Overall policies will be coordinated and directed at Racine. Parts facilities for Jacobsen, Worthington, and Johnston mowers are to be established in all principal cities. The Jacobsen organization acquired the Johnston Lawn Mower Corp. of Ottumwa, Iowa, in 1940.

Concrete-Finishing Tools

An extensive line of finishing tools for concrete construction is illustrated in a bulletin available from the Heltzel Steel Form & Iron Co. The folder shows the Heltzel hand broom, lute, straightedge, all-steel tamp, long-handled and hand edging tools and floats, forming mules, and gutter and curb tools.

Copies of this Bulletin A-22-T may be secured direct from the Heltzel Steel Form & Iron Co., Warren, Ohio. Just mention this item.

Cleveland Sinkers

...Cleveland Sinkers are ...consumption. Many sizes, in wet or dry co... ...g in every type of rock. Available with chucks for collared ...steel, and plain or lugged shanks. Drop forged construction insures super strength. End-seating valve (used on most models) improves with use, prevents greater air consumption as drill grows older. • Mountings available for Models H111 and H10 for conversion to drifter type drills, used on column arm or tripod. • Be sure to use these sinkers with the Cleveland Accessories shown here. *Remember, the most efficient rock drill delivers even better performance when equipped with the proper, high-quality accessories.*

Write for Bulletin 122 on Sinkers—Bulletin AC-11 on Accessories

Model H23, 83 lbs. For extra tough drilling.

Model H111, 55 lbs. An all around favorite.

Model H10. Leader in the 45 lb. class.

Model H66, 32 lbs. Light but powerful.

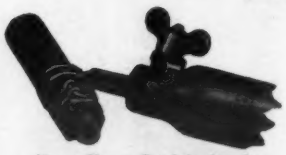
FOR BEST RESULTS USE

CLEVELAND ACCESSORIES

"Veribest" Air Hose is extra tough, withstands rough treatment.

Cleveland Air Filters prevent fine trash from entering your drill.

Cleveland Line Oiler keeps drills amply lubricated and working at top speed.



Hose Clamp Tool is handy and efficient for securing wire clamps to hose and fittings.

Type "A" Couplings are made of a tough, rust-proof, bronze alloy. Quick-acting.

LEADERS IN DRILLING EQUIPMENT

CLEVELAND ROCK DRILL DIVISION
THE CLEVELAND PNEUMATIC TOOL CO.
CABLE ADDRESS: "ROCKDRILL"
CLEVELAND 5, OHIO

BRANCH OFFICES

Birmingham 19, Ala.
Butte, Mont.
Dallas 1, Texas
Denver 2, Colo.
El Paso, Texas
Ironwood, Mich.
Lexington 19, Ky.
Los Angeles 11, Calif.
Newton Highlands 61, Mass.
New York 6, N. Y.
Pasadena 8, Calif.
Philadelphia 32, Pa.
Pittsburgh 22, Pa.
Salt Lake City 1, Utah
San Francisco 3, Calif.
St. Louis 3, Mo.
Wallace, Idaho
Washington 5, D. C.

CANADIAN DISTRIBUTORS

Purves E. Ritchie & Son, Ltd., 658 Hornby Street, Vancouver, B. C.
Industrial Machinery Co., Ltd., 163 N. Water St., Halifax, Nova Scotia

Contraction Joints With Concrete Keys

The Keylode contraction joint was introduced to a few highway engineers in 1940 as a device designed to overcome the failure of dummy-type joints without materially increasing the cost of concrete pavements. The design of this joint was new and simple and the load-transfer method was obvious. Several concrete pavement projects, constructed in 1941, specified Keylode contraction joints. During the war, pavements built with Keylode joints were submitted to terrific loads far beyond the expectation of the engineers who designed them. The joints are reported to have stood the test and the pavements in which they were used are smooth and unbroken.

Keylode joints are designed to provide a uniformity of interlock. To accomplish this, pockets are formed alternately to the right and to the left along both the top and bottom of a metal strip. Through the center of this deformed strip, a flat ⅛-inch plate is inserted to add rigidity to the joint. When placed on the subgrade, the joint is supported by metal shoes which hold it in vertical alignment. This contraction joint is actually a rigid metal form which molds the concrete into a continuous interlocked joint wherein the concrete provides its own load transfer across the joint. After the initial set, each of the adjacent slabs is provided with a series of alternate concrete ledges which fit into and support the opposite slab.

Keylodes are not plate-type dowel joints, since the plate is only a stiffener member which provides a steel sliding surface for the concrete when the joint opens and closes, and does not form a horizontal plane of weakness. No special installation equipment is required, and the simplicity of installation, compared to the cumbersome dowel-bar joints, is obvious, the manufacturer says. For this reason, contractors can afford to bid lower per square yard of pavement where Keylode joints are specified, it is claimed.

The continuous plate of Keylode joints serves as a dam to retard pumping action and the infiltration of foreign matter into the joint. Installed in thin airport pavements, not designed for heavy loads, Keylode joints have not required any maintenance expense and are smooth and unbroken after four years of pounding by heavy bomber loads, according to Highway Steel Products Co., Chicago Heights, Ill.

Complete data may be obtained by readers of CONTRACTORS AND ENGINEERS MONTHLY who write the firm's Engineering Department.

JACKSON
ELECTRIC VIBRATORY HAND SCREED

Brand New and What a Honey!

The new JACKSON revises all previous ideas of what constitutes a thoroughly convenient, highly efficient hand screed. There is nothing in screed history that begins to approach it. Listen to this:

ONE MAN OPERATES IT WITH EASE

The position in which the vibratory motor is mounted tends to make the entire screed *self-propelled!*

SECOND PASSES — *Easily, Quickly Made*

by simply lifting the handle and rolling the machine back as far as necessary. No other screed has this feature.

GETS RIGHT UP TO THE WALLS

Nothing protrudes beyond the end of the screed. Hence it may be operated practically *against the wall.* With no other screed, to our knowledge, can you do that.

VARIABLE FREQUENCY CONTROL TO SUIT CONSISTENCY OF ANY MIX

by instant adjustment of power plant engine throttle. Thus plenty of energy may be had for thoroughly puddling stiffest mixes throughout the section; vibrations reduced for second passes.

INSTANTLY ADJUSTABLE ROLLERS

to vary screed length over 4 ft. range. Screed planks quickly renewed. Available in any practical length.

A NEW HIGH IN DEPENDABLE PORTABLE POWER

is now available in the JACKSON postwar Power Plants. These have permanent magnet generators in which all usual maintenance, other than lubrication, is eliminated. Especially designed for severest service under continuous operating conditions. Simple, rugged construction and design, stripped of fussy control gadgets. Operate all Jackson Vibrators. Ideal for lights, and all types of contractors' power tools. 1 to 7.5 KVA sizes available. Get the facts on this time and money saving equipment! Write, NOW.

Above—Tilted to make a second pass.

Left — Forward movement requires little more than guidance on part of operator.

ELECTRIC TAMPER & EQUIPMENT CO. LUDINGTON MICHIGAN

Pacific
SHEAVE BLOCKS CAN "TAKE IT"

You can see how the sheave rims are recessed into the side plates so that the rope cannot be forced between them—you can see how the wide, deep flanges on the sheaves minimize rope wear on side plates—also see how the "snatch block" design permits quick, easy replacement of the rope.

What you do not see is that the sheaves, side plates, shackles and yokes are made of tough electric steel castings—that the bearings are well protected from dirt and water—and that both design and construction are based on years of experience.

But you will appreciate both "seen" and "unseen" quality long before your PACIFIC Sheave Block needs repairs or replacement.

Ask for your copy today.

ALLOY STEEL & METALS CO.

1862 East 55th Street, Los Angeles 11, California

Manufacturers of PACIFIC SLUSHING SCRAPERS & SHEAVE BLOCKS • PACIFIC CRUSHING & SCREENING UNITS • PACIFIC ROCK BIT GRINDERS • PACIFIC ALLOY-MANGANESE MILL LINERS & CRUSHER JAWS • PACIFIC TRACTOR RIMS, CRAWLER SHOES & Wearing Parts

ELECTRICITY

1500 WATT PORTABLE

WHEN YOU WANT IT
WHERE YOU WANT IT

• For Operating Power Tools • Floodlights • Field Repair Shops • Service Trucks • Paving Machines • Power Shovels • Earth Moving Equipment, etc.

There's an economical "U.S." unit for every construction-work need. Engineered by men with practical, out-in-the-field experience. Built to take every punishment — and operate faithfully for long continuous hours. Sizes from 500 watts to 15 KW. Skids, rings, porter bars, and trailer mountings available.

"U.S." BUILDS A COMPLETE LINE of Gasoline and Diesel Electric Plants up to 75 KW—for standby, continuous duty, battery-charging, and portable uses. Write for literature, stating type of unit and capacity required.

UNITED STATES MOTORS CORP.
554 Nebraska Street Oshkosh, Wisconsin
Factory representatives strategically located throughout U. S. A. and Canada.

"U. S." ELECTRIC PLANTS

Bituminous-Concrete Runways on Macadam

(*Continued from page 1*)

base before laying a 9-inch layer of slag dry-bound macadam. The macadam was choked with slag chips, given an asphalt prime coat, and then topped with 2 inches of plant-mix bituminous concrete which was finished off with a seal coat. The plant-mix top was increased to 2½ inches for 200 feet at each end of the runways.

Grading

Over 5,000,000 cubic yards of earth has been moved in the construction of the airfield, but the bulk of the heavy grading was done in previous years. The 1945 contract amounted to only 200,000 cubic yards. The excavation was mostly clay and shale, containing some rock and a large amount of inferior coal, occurring in veins averaging 2 to 4½ feet thick, with one unusual 8-foot stratum at the southeast end of the field. Several bituminous coal mines, now exhausted and abandoned, were once active at this site. As there was a surplus of material over the whole job, the rock and coal which was unsuitable for the fills was wasted in a couple of adjoining swamp areas.

This last grading contract, however, included some of the most difficult work on the entire site, with 80,000 yards required to complete the fill at the northerly end of runway 3. The maximum height of this 1,100-foot-long fill from original ground to grade is 120 feet. To prevent this great mass of earthwork from sliding, two trenches, in the shape of a V, were excavated at the bottom of the existing side-hill slopes. These keyways, 200 feet long, 50 feet wide, and 15 feet deep, were dug with shovels.

Placing Fill

Material for this fill was obtained by leveling a knoll east of the south end of runway 1 with a Koehring 1½-yard and a Lima 1¾-yard shovel, and hauling the shaly clay an average of 3,500 feet in three 17-yard bottom-dump Euclids and five 14-yard end-dump Sterling trucks. Great care was taken to build and maintain a smooth, well graded haul road, 50 feet wide, over which the trucks operated at 30 mph. A Caterpillar No. 12 power grader was assigned to keep this road in shape, and such precautions paid dividends as not a tire was blown nor a spring broken on any of the trucks during this intensive work when each unit made an average of five round trips an hour.

The fill was placed in 8-inch layers, with a 10-foot bench at each 20-foot rise in elevation, and was compacted by four double-drum LaPlant-Choate sheepsfoot rollers pulled by one D7 and three D6 Caterpillar tractor-dozers. Further compaction was given by two Huber 10-ton 3-wheel rollers, while the top was leveled off by the tractor-dozers and another Caterpillar No. 12 power grader. Five benches were needed to reach the top of the highest fill.

Besides this long haul, the trucks were used on shorter trips averaging 1,000 feet at other grading points. For short hauls averaging 600 to 800 feet and never exceeding 1,200 feet, one 10-yard and two 16-yard LaPlant-Choate scrapers pulled by Caterpillar D8 tractors were used. They were also employed in making shallow cuts over a wide area and stockpiling the material which was later removed by shovel and trucks. To make the cutting easier, the original ground was first broken by a double-disk harrow. The tractors with the scrapers usually ran in fifth gear at a 5 to 7-mph speed, and were helped in loading by either a D8 or a D6 Caterpillar tractor acting as a pusher.

(*Continued on next page*)

Here it is . . . The New . . .

H&B ESTABLISHED 1897

MOTO-PAVER

Resurfacing a Michigan Road with the Moto-paver

An Entirely Self Contained, Self Propelled Asphalt Mixing and Laying Machine

Mixes, Spreads and Lays Any Type of Mixed-in-place Bituminous Material to Any Road Width, Thickness and Crown Condition.

Hetherington & Berner Inc., America's first builders of asphalt mixing machinery, proudly present the Moto-paver—the last word in asphalt mixing and laying equipment. This highly flexible and mobile machine is a complete traveling asphalt mixer and paver, requiring no separate loader, spreader or other paving equipment, and no trailer to haul it from one job to another. The Moto-paver is mounted on pneumatic tires, and powered by two gasoline engines, one driving the mixer and related units, the other driving the machine along the road. Paving speed is from 4 to 50 feet per minute, road speed 15 to 18 miles per hour. Mixing capacity is 100 to 120 tons per hour.

The Moto-paver mixes and lays all but the highest types of bituminous concrete. It is especially suitable for resurfacing trunk roads and streets of smaller municipalities, but it is also an efficient unit for new construction work on roads, streets, airports, parking lots, driveways, etc.

Write for bulletin MP-46, which gives complete information and specifications.

HETHERINGTON & BERNER INC. • 731 KENTUCKY AVE. • INDIANAPOLIS 7, IND.

Hetherington & Berner

America's First Builders of Asphalt Mixing Machinery

CARRYHAUL

Trade Mark Registered

FOR TRAILING EQUIPMENT 'CROSS TOWN OR 'CROSS-COUNTRY..WITH ECONOMY

There's a proper size of safe, easy-loading MARTIN TRAILER to hustle light equipment 'cross town —or to highball a giant D8-Dozer 'cross-country—with economy.

Your "CATERPILLAR" Dealer is your MARTIN Dealer. See him for your trailer needs.

Write for Booklet

MANY MARTIN MODELS 5 TO 20 TON CAPACITY

MARTIN MACHINE COMPANY

KEWANEE, ILLINOIS

★ Buy Victory Bonds

★ Save Waste Paper

★ Turn in Scrap Metal

★ Be a Blood Donor

★ Pay only Ceiling Prices

Bituminous-Concrete Runways on Macadam

(*Continued from preceding page*)

Another sizable fill, 1,800 feet long and having a maximum height of 75 feet, was placed along the southwest side of runway 3. The lower bench in this fill was used as a haul road by concrete truck-mixers when headwalls for culverts going through the fill were poured. Of the total earth work on the job, about half was moved by scrapers and the rest by trucks, with an average of 5,000 cubic yards placed in a 10-hour day, using all equipment. The slopes were later trimmed and the ditches opened by a Koehring dragline using a Williams 1½-yard bucket.

Drainage

In addition to the previously installed drainage system, the grading contractor also laid 37,000 linear feet of vitrified-clay pipe from 6 to 21-inch size. According to the specifications, either vitrified-clay or concrete pipe could be used, but a strike in the concrete-pipe manufacturing plants in the vicinity prevented the exercise of any option as to choice of material. Excessive rainfall during the first half of 1945, and the large number of springs that were discovered at the airfield created a difficult drainage situation.

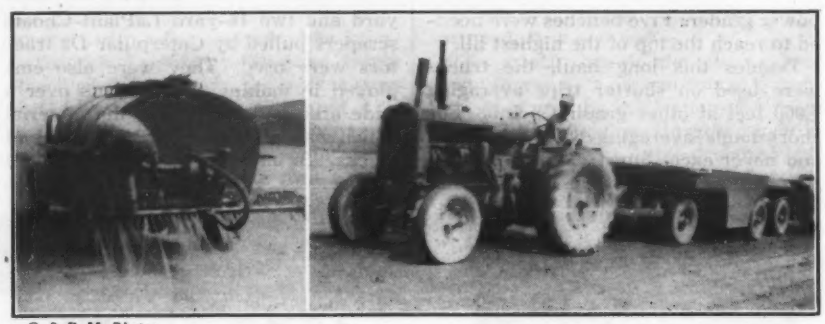
Most of the drainage consists of 6 and 8-inch cradle-invert pipe, a drain with a semi-circular cross section laid with the curved side down, located 2½ feet off the edge of the runway at an average depth of 4 feet. Trenches were dug by a Lorain ¾-yard Backdigger, a Michigan ½-yard Trench Hoe, and a Northwest ½-yard Pullshovel. The 6 to 8-inch pipe was laid with open joints, and at about 300-foot intervals empties into catch basins, from which the subsurface water is conducted to manholes in the sealed-joint pipe up to 15-inch size. The open-joint-pipe trench was backfilled with 6 to 12 inches of slag.

From the manholes, the accumulated water from the greater portion of the two long runways is brought through an 18-inch Transite pipe to a stilling basin located just south of the intersection of the X. This stilling basin was built with concrete baffles to retard the flow of the water down the steep slope to the ditch line, and was lined with riprap to a 6-inch depth for 20 feet.

With the use of the porous granular sub-base on the runways, cross drainage was practically eliminated, with only three pipes, of 15, 18, and 21-inch size, having to be laid under the pavement. These are for the purpose of carrying surface drainage from one side of the runway to the outfall on the other side.

As a further protection against heavy rains, a 700-foot concrete drainage structure was constructed flush with the ground at a low point parallel to the east edge of runway 3. This long inlet is 2½ feet deep, 1 foot wide, has 8-inch walls and a concrete floor, is covered with a cast-iron gate, and drains to a manhole with connections to the stilling basin. Its purpose is to augment the function of the nearby vitrified-clay-pipe drain.

The paved landing strip, with a 1½ per cent slope from the center line, and the shoulders and taxiways make a total runway width of 500 feet. At the outer edges of the fills is a sodded earth dike, 2 feet high with a 3-foot crown, to prevent surface water from running down and eroding the slopes. Any water thus trapped is conducted to the basins of the regular side drains near the edge of the dike. Another precaution taken was the laying of a drain pipe at the original toe of the slope in some locations to prevent any washing at the bottom of the fills.



C. & E. M. Photos

Sub-base for the runways at the Wheeling airport was watered from a 10-foot spray bar on truck-mounted tanks and compacted by two rubber-tire rollers pulled in tandem by a Minneapolis-Moline wheel tractor.

Porous Sub-Base

Material for the sub-base, totaling 100,000 cubic yards, was taken from a borrow pit purchased by Warren Bros. and located adjacent to State Route 2 about 4 miles north of Short Creek, or 6½ miles from the center of the airport. This was the closest available source of suitable granular material consisting of a sandy gravel with a mixture of some clay and loam which made a good bond. The pit was about 300 feet long with a 30-foot face, and was worked by a Lima 1¾-yard shovel which mixed the material by always excavating from the bottom of the face, thereby loosening the loam and clay on top, and causing it to drop and be picked up with the sand and gravel. An International TD-14 tractor with dozer pushed the material to the shovel.

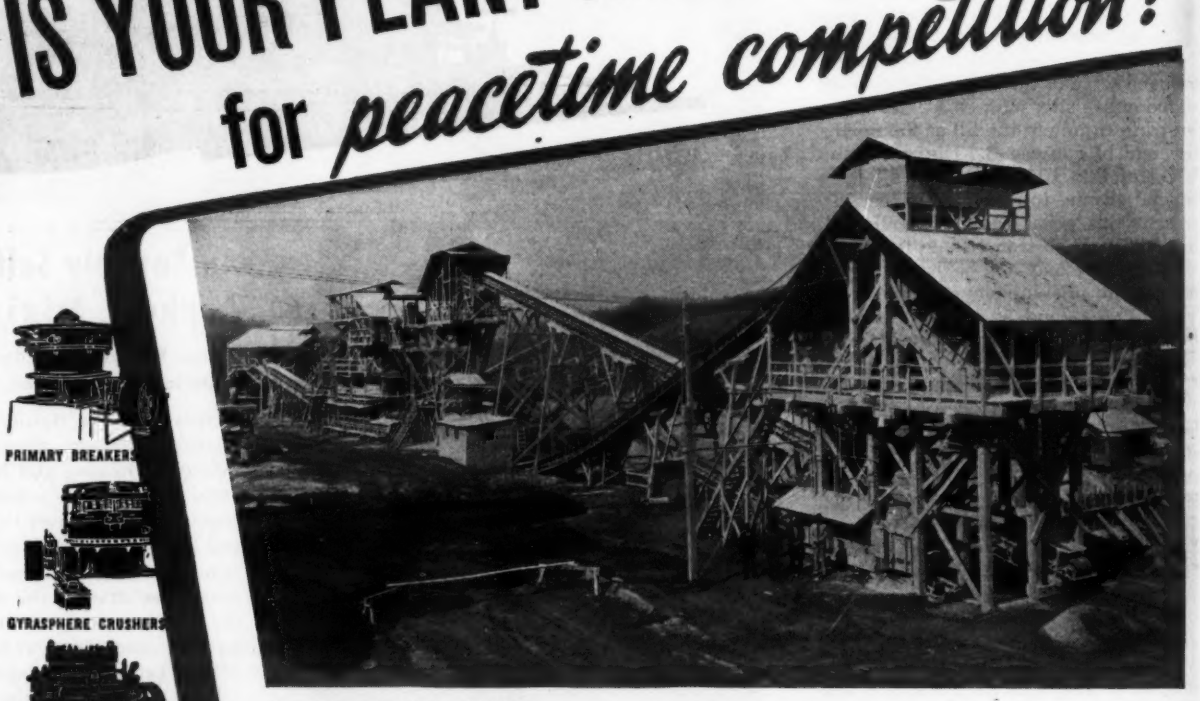
The greatest problem confronting the contractor at this stage of construction was obtaining trucks to haul the sub-base material to the airport. He had estimated his requirement to be fifty trucks but could get only half this number. Another adverse factor in the trucking circles was the hilltop location of the airport, which meant a steep climb up the 2½-mile access road leading from the state highway, with the last mile at continuous 9 per cent grade.

Watering and Rolling

The twenty-five assorted trucks, mostly Fords, Internationals, Chevrolets, and Macks, were hired on a yardage basis and hauled an average of 4 yards to the load. In the best 10-hour day 328 loads totaling 1,312 yards were hauled with all trucks working, but the average was around 225 loads per day. The trucks spot-dumped the loads on the grade at 10-foot centers in both directions, while three Caterpillar

(*Continued on next page*)

IS YOUR PLANT READY for *peacetime competition?*



PRIMARY BREAKERS

GYRASPHERE CRUSHERS

INTERCONE CRUSHERS

JAW CRUSHERS

SAND CLASSIFIERS

PULSATOR VIBRATING SCREENS

HEAVY DUTY FEEDERS

Complete modern Telsmith plant . . . producing both coarse and fine aggregates in several sizes.

● RIGHT NOW your plant faces a changed market. Peacetime construction contracts are different. Your customers are different. Competition is keener. This calls for plant planning *now*—for rearrangement and additional equipment. For example, more re-crushing, screening or washing capacity . . . to produce the smaller sizes, in the quantities and quality your market demands. Do this with Telsmith equipment. It gives your plant this necessary product flexibility—boosts its output. Cuts power and maintenance costs. Telsmith equipment keeps your production costs down to a figure that insures you a good profit. Telsmith's 40 years of equipment-building complete-plant-engineering know-how is at your disposal. Write us in detail; or send for Bulletin E-34.

E-6R

TELSMITH Equipment

FOR SAND, GRAVEL AND ROCK CRUSHING PLANTS

SMITH ENGINEERING WORKS, 4014 N. HOLTON STREET, MILWAUKEE 12, WISCONSIN

Cable Addresses: Sengworks, Milwaukee—Concrete, London

51 East 42nd St. New York 17, N.Y. — 211 W. Wacker Drive Chicago 6, Ill. — 713 Commercial Trust Bldg. Philadelphia 2, Pa. — 247 Third St. Cambridge 42, Mass. — Boebek Eqpt. Co. Milwaukee 3, Wis. — Mines Eng. & Eqpt. Co. San Francisco 4—Los Angeles 14

Brandeis M. & S. Co. Louisville 8, Ky. — Rish Equipment Co. Charleston 22, and Clarksburg, W. Va. — Rish Equipment Co. Roanoke 7, & Richmond 10, Va. — North Carolina Eqpt. Co. Raleigh and Charlotte 1, N. C. — Wilson-Weesner-Wilkinson Co. Knoxville 8, and Nashville 6, Tenn.

Bituminous-Concrete Runways on Macadam

(*Continued from preceding page*)

power graders, two No. 12's and one No. 11, spread the material to a loose uniform depth of 4 inches. Then the graders pushed the material into windrows, spaced 8 feet on centers, in order to mix it thoroughly, and then respread it over the runway.

Water was sprayed over the layer of sub-base from a 1,200-gallon tank mounted on a Chevrolet truck, and a 1,500-gallon tank on a Ford truck, each equipped with a 10-foot spray bar in the rear. Water for the tanks was pumped from a creek within 1½ miles of the airport by a Marlow 3-inch pump, and a similar pump was rigged up at the rear of each tank truck to force the water from the spray bar. The flow was more positive under pressure than by gravity alone.

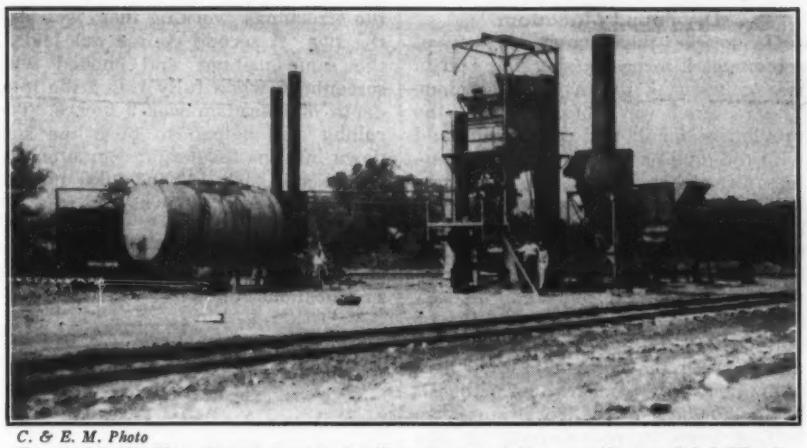
Along with the watering, the sub-base was compacted by two rubber-tire rollers pulled in tandem by a Minneapolis-Moline rubber-tired tractor. The first was a Bros wobble-wheel 10-ton roller, which with its vibratory movement did not stay in line when a hard spot was crossed, but wobbled off and compacted the adjoining material. Behind it came an Ingram straight-wheel roller for direct compaction. Better results were obtained on this type of subgrade with these rollers than with a steel-wheel roller, which had a tendency to bridge some of the softer material between the more firm and solid areas.

The 4-inch loose layer compacted to slightly over 3 inches for the first course, and this procedure was repeated for the next two courses until the total compacted depth of sub-base was 10 inches. Another layer was added for 500 feet at the end of each runway to give a compacted depth of 14 inches where the greatest stress occurs due to planes warming up and turning around.

A typical sample of the gradation of the sub-base material had the following proportions.

Sieve Size	Per Cent Passing
1½-inch	100
1-inch	95
¾-inch	89
No. 4	67
No. 10	55
No. 40 (dry)	28
No. 40 (washed)	36

The liquid limit of this sample tested only 15.7 per cent as compared with the allowable 25 per cent, and had a plasticity index of 0 while the specifications permitted nothing over 6. The Proctor density requirement of 95 per cent was met with a figure of 98.3. An average of 900 cubic yards of sub-base material was laid in a 10-hour day.



C. & E. M. Photo

To provide the bituminous concrete for the runways at the recently completed Wheeling, W. Va., airport, Warren Bros. set up a portable plant, with a capacity of 500 tons of hot-mix per 10-hour day, on a level area between the river and the railroad. Two spur tracks served the plant.

Insulation Course

On top of the sub-base material a layer of slag screenings was placed at the rate of 75 pounds to the square yard, or to a thickness of about ¾ inch. This layer of screenings not only leveled off any irregularities in the sub-base, but also serves as an insulation at the bottom of the macadam to keep the soil from working up into the pavement.

The material was purchased from the Weirton Steel Co. mill at Steubenville, Ohio, and was shipped 20 miles in hopper-bottom cars via the Pennsylvania Railroad to the siding at the asphalt plant, which was set up by Warren Bros. on the west side of State Route 2, a mile south of Short Creek, and 3½ miles from the airport. The screenings were unloaded into a large hopper beneath the siding track, and carried from there on a Robins 116-foot conveyor belt, 24 inches wide, to a Blaw-Knox 105-ton bin. Power for the conveyor came from a Crocker-Wheeler 30-kw generator driven by a Caterpillar D6600 diesel engine. With this equipment fifteen carloads of screenings were unloaded in a 10-hour day.

From the bin the screenings were

(*Continued on next page*)

Model NH5W with 4-80,000 C. P. floodlights.

The NITE-HAWK gives you:

LIGHT—Where you want it—when you want it.

POWER—To operate hand tools—saws, drills, hammers, etc.

Floodlight and Searchlight Units up to 14 million candlepower.

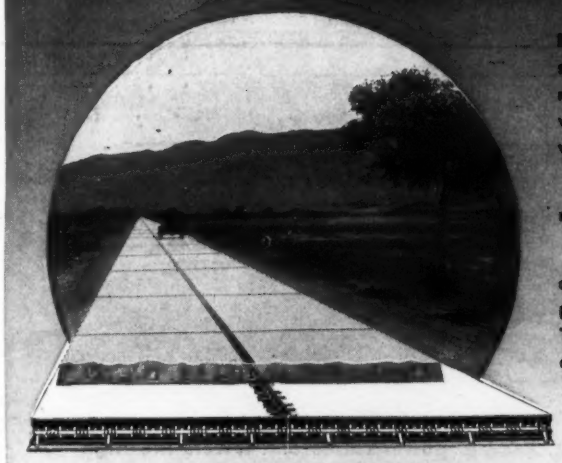
Write for Bulletin A.E.D.

LISTER-BLACKSTONE, Inc.

1706 So. 60th Street MILWAUKEE, WIS.

There's no Disagreement on . . . . . .

Road Joints!

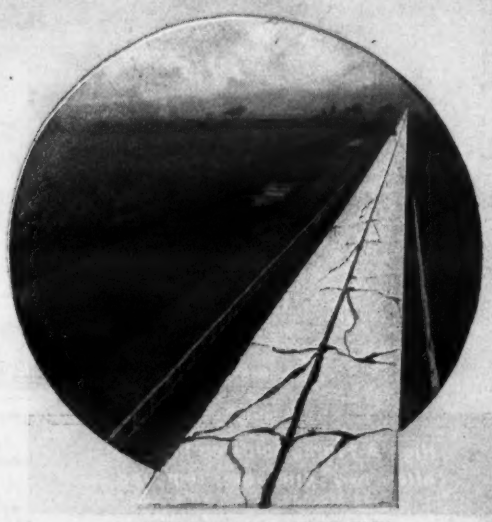


A GOOD INSTALLATION WITH KEYLODE TRANSVERSE JOINTS

In the 20s and 30s when concrete road building was getting its start, it was logical for highway engineers to resist the use of metal road joints. These joints were costly and new. Their use would cut down the total miles of hard road that could be built with the money at hand—and farmers were stuck in the mud!

The objective *then* was *miles today*. The cost tomorrow in maintenance was a secondary consideration.

In 1934 Federal engineers, realizing the necessity for *crack control* in concrete pavements, issued a bulletin requiring expansion and contraction joints on all new federal-aid highways. The large reduction in maintenance costs on federal-aid roads attests the wisdom of this action.



A POOR INSTALLATION WITH NO TRANSVERSE JOINTS

Today there's no disagreement on road joints. Everyone agrees that crack control in concrete pavements by the use of load transferring expansion and contraction joints is an economic necessity. The only unsettled problems involve the spacing, the design and the cost.

The mass of available data will make it easy for highway engineers to establish a joint spacing standard soon.

Many engineers have already decided that the KEYLODE contraction joint is the design they want—and the cost of KEYLODE joints is so little that you can get BOTH *miles today* and *crack control tomorrow* for the same money.

Write for Bulletin

HIGHWAY STEEL PRODUCTS CO.

Chicago Heights, Ill.

KEYLODE

CONTRACTION JOINTS

Bituminous-Concrete Runways on Macadam

(*Continued from preceding page*)

transported to the airport, whenever the trucks were not hauling sub-base material, and were deposited in a huge stockpile which grew to a 16,000-ton size. When the sub-base was ready, a Mead-Morrison ½-yard shovel loaded trucks from the stockpile, and the screenings were distributed by a Burch spreader, then watered, and rolled as was the sub-base.

The gradation of a typical specimen, weighing 90 pounds per cubic foot, culled from the stockpile, together with the specifications required, was as follows:

Sieve Size	Per Cent Passing	Specified
½-inch	100	100
No. 4	87	85–100
No. 100	6	5–25

Dry-Bound Macadam

On top of this smooth surface of screenings 9 inches of slag was laid in two courses as dry-bound macadam. The material was obtained from the previously mentioned steel mill, and with the total needed supply of screenings already stockpiled, the same unloading equipment was used at the asphalt plant. The cars loaded with slag were shifted about on the siding by an International rubber-tired tractor, which greatly speeded the unloading operations by keeping the conveyor belt constantly in use. The slag was dumped from the storage bin into a fleet of about twenty trucks which hauled it to the runways, where it was spread in 10-foot lanes in two courses by two Adnun Black Top Pavers.

The first course, about 4½ inches thick, was choked with slag screenings from the Burch spreader, and rolled by two 10-ton 3-wheel rollers, a Buffalo-Springfield and a Galion. The second roller pulled an 8-foot-wide drag broom with 6-inch fiber bristles over the screenings, working them well into the slag. A second course was laid in the same manner and choked with screenings; when fully rolled the total depth of macadam was 9 inches. The rolling also helped to push the slag down into the insulation course on top of the sub-base. About 1,000 tons of dry-bound macadam was laid in a 10-hour day.

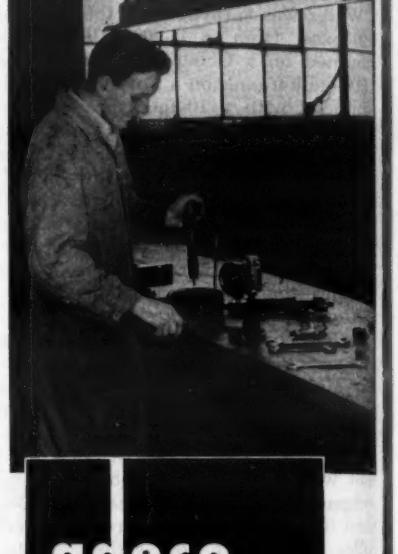
The gradation of the dry-bound macadam and a comparison with the specifications follow:

Sieve Size	Per Cent Passing	Specified
3-inch	100	100
2½-inch	100	90–100
1½-inch	53.8	25–60
¾-inch	5.1	0–10

Asphalt Plant

Except for the uphill haul to the airport, which of course could not be eliminated, the site chosen for the asphalt plant, where the black-top paving was mixed, was ideal. A Warren Bros. portable road plant with a 1-ton pugmill, having a potential capacity of 500 tons of hot-mix in a 10-hour day, was set up in a large level area between the Ohio River and the Pennsylvania Railroad track. From this track two long spurs were laid, one on each side of the plant. The spur track on the west accommodated tank cars containing asphalt shipped via the Pennsylvania Railroad from the Standard Oil Co. of Ohio refineries at Cleveland, while the track on the east side of the plant held

(*Continued on next page*)



High A-Frame folds up like this after two pins are removed.

Because power raises and lowers the High A-Frame fast, you cut moving expenses every time you ship the new Koehring 30-ton crane by rail, every time you truck it through a highway underpass, every time you move it under overhead obstructions on the job. In just a few minutes you reduce overhead clearance from 18'-8" to 12'-9".

REMOVE 2 PINS, THAT'S ALL

Raising or lowering the 605 High A-Frame is simple, safe. Remove 2 pins and the High A-Frame is ready for lowering by power. A cable attached to the hoist-drum controls lowering speed. The same cable raises the 605 High A-Frame back into position. No danger of over-pulling because the High A-Frame comes to a definite stop when fully raised.

SUSPENSION CABLES STAY ON

Boom suspension cables stay in place on short moves. Because the frame is strong, the Koehring 605 crane may be operated with the High A-Frame in any lowered position.

ASK FOR YOUR 605 CATALOG TODAY!

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

adeco...

NOZZLE TESTER
Keeps Diesel Engines Running Efficiently

To keep diesel engines operating at peak efficiency, this portable, precision-built Adeco Nozzle Tester is indispensable.

Light in weight yet built for heavy-duty service, it enables any mechanic to make quick accurate tests on injector opening pressure, spray pattern, etc., and detect stuck needle valves and leakage around valve seats. Tests both large and small injectors, on bench or engine, at pressures up to 10,000 p. s. i. Prevents costly delays and possible damage to engine.

Ideal for testing hydraulic devices.

Write for bulletin on this practical, low-cost unit.

TESTS FUEL INJECTORS AND HYDRAULIC DEVICES at Pressures up to 10,000 p.s.i.

ADEC AIRCRAFT & DIESEL EQUIPMENT CORP.
DEPT. 9; 4411 N. RAVENSWOOD AVE.
CHICAGO 40, ILLINOIS

Complete line of gasoline, pneumatic and electric driven concrete vibrators and grinders
Write for information and prices
ROETH VIBRATOR COMPANY
1737 Farragut Ave. Chicago, Ill.

Bituminous-Concrete Runways on Macadam

(*Continued from preceding page*)

cars of slag aggregate shipped from the steel mill at Steubenville, Ohio.

Two vertical coal-burning boilers, a 50 and a 40-hp, supplied steam for heating the tank cars, the 10,000-gallon asphalt-storage tank, the pipes carrying the asphalt to the plant, and for the burners in the drier. From the boilers the steam was brought to the west spur track in an underground pipe line having three sets of connections at the end for heating three cars simultaneously. When the asphalt was sufficiently heated, it was pumped from the cars to the storage tank by a Warren Bros. 4-inch pump, driven at first by the same generator that operated the long conveyor belt. This set-up was later changed as the speed of operations increased, and the pump was given a separate engine, a Caterpillar D4400, which was connected to the pump through a Link-Belt gear reducer lowering the rpm of the engine from 1,150 to 150. The 3½-inch asphalt pipe enclosed a ¾-inch line carrying the live steam.

Movement of Materials

The slag screenings used in the hot-mix were also unloaded by the conveyor belt and stockpiled at the plant, while the coarser slag aggregate was removed from the gondola cars by a Northwest crane with a 40-foot boom and an Owen 1-yard clamshell bucket. The crane loaded the slag and slag screenings into a double-compartment 35-ton bin, from which the aggregate was discharged through the bottom to a Warren Bros. drum feeder with adjusting gates which controlled the flow of the two grades of material. From the feeder the aggregate was lifted by an 11-foot bucket elevator to a single-drum drier, 24 feet long x 5 feet in diameter, which was heated at the opposite end by a Hauck and a Gem burner. Only if the aggregate was unusually wet was it necessary to use both burners.

A Warren Bros. 60-inch exhaust fan supplied a draft for the drier, and also removed the dust and fines to a dust collector, 8 feet in diameter at the top. This material settled to the funnel bottom of the bin and was then moved along by a worm screw to the bottom of the hot elevator. The heated fines and coarse slag were raised 36 feet in this enclosed elevator and discharged onto a revolving rotary screen, 8 feet long x 3 feet in diameter. The outside screen was ¾-inch size and enclosed a 2-foot-diameter screen which was ⅜-inch size for half its length, and No. 4 size for the remaining 4 feet of screen. Below the screens was a 3-compartment 20-ton bin which caught the three different gradations of aggregate.

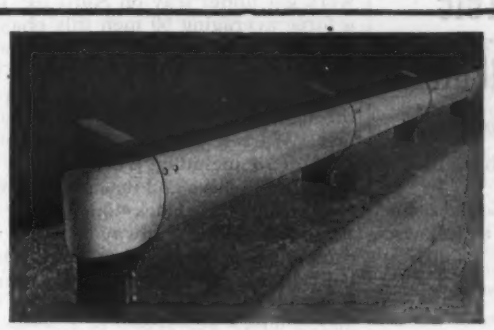
The asphalt was pumped from the storage tank to the plant by a Warren Bros. 3-inch pump, driven by a Troy steam engine, through a pipe of the same type used in moving the asphalt from car to tank. A pressure relief valve in the line returned excess asphalt to the storage tank and shut off when the operator drew the asphalt into the weigh bucket. After the asphalt and the aggregates were weighed on separate Howe scales, they were emptied into the 1-ton pugmill and mixed for half a minute. An Eagle Signal Corp. timing device prevented the mix from being discharged before this minimum time had elapsed. A four-way steam valve opened the pugmill gates and let the hot-mix drop into the trucks beneath.

A single Caterpillar D13000 diesel engine on a central drive operated the entire plant. Bunker C fuel oil for the drier torches was stored in two tanks, each holding 4,500 gallons, located alongside the 10,000-gallon asphalt tank. A meter was attached to the fuel-oil line so that the amount of oil consumed per ton of hot-mix could be determined. Water for the boilers was pumped from the river by a 4-inch Rex, and sent through 220 feet of 2-inch cast-iron pipe to two 550-gallon storage tanks, located in a group with the asphalt and fuel-oil supply.

Runway Paving

A few days before starting the black-top paving, the dry-bound macadam was given a prime coat of 0.35 gallon of MC-1 asphalt to the square yard. The plant-mix was hauled to the site in seven International trucks belonging to the Bryan Trucking Co. of Wheeling, hired on the basis of tons carried, with each truck holding 5 tons. The mix was laid in a single course, 2 inches thick, except at the runway ends where it was laid 2½ inches thick, in 10-foot lanes, by a Barber-Greene bituminous fin-

(*Concluded on next page*)

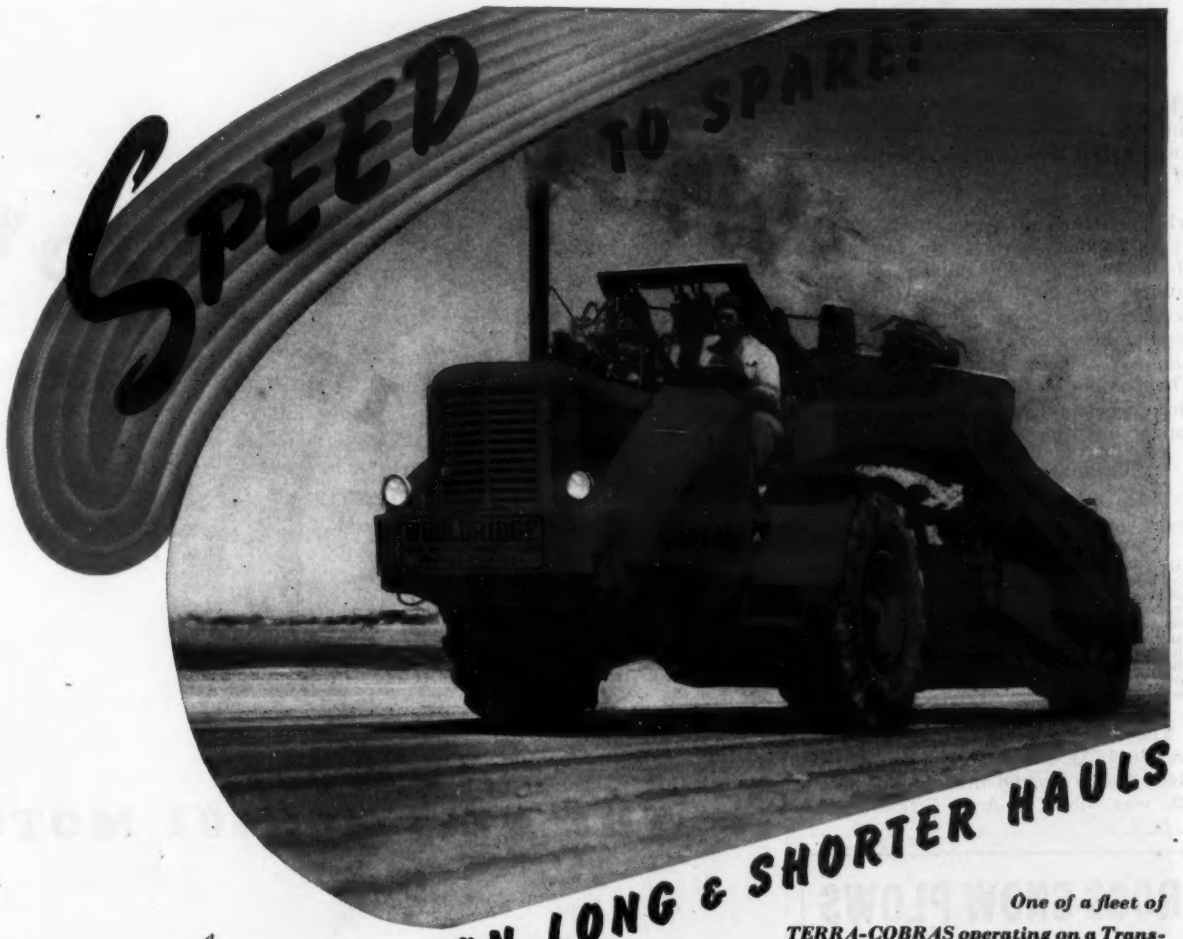


High Visibility
Low Upkeep
TUTHILL GUARDS
Insure Better, Safer Highways

HIGH VISIBILITY, due to convex surface, makes TUTHILL the safer Guard. Seen quicker, warns of danger, is struck less, reduces number of accidents. Spring-bracket supported rails are flexible, yet strong, under impact; deflect cars back into highway, prevent serious damage and undue loss of life. Make TUTHILL, the *better* Guard Rail, your choice.

Request details Pacific Coast Manufacturers and Distributors: U.S. SPRING & BUMPER CO., Los Angeles, Calif.

TUTHILL SPRING COMPANY
762 W. POLK ST. CHICAGO 7 ILL.



One of a fleet of TERRA-COBRAS operating on a Trans-Pacific air base on the West Coast

Wooldridge Terra-Cobra self-propelled earthmovers consistently maintain speed up to 21 m.p.h. fully loaded. Positive two-wheel steering control eliminates the necessity of slowing down for rough travel, sharp turns, passing on narrow strips, or spreading on soft fills. Faster round trips from cut to the fill result in greater total yardages at a higher profit and lower yardage cost. *Investigate fully, today.* Write for complete Bulletin TA-425.

WOOLDRIDGE
MANUFACTURING COMPANY
SUNNYVALE · CALIFORNIA · U. S. A.

Hi-Speed Self-Propelled EARTHMOVERS

WOOLDRIDGE
EARTHMOVING EQUIPMENT
Includes

SCRAPERS
Tractor-drawn for handling heaping yardages from 6 to 28 cu. yards.

★ **POWER CONTROL UNITS**
Single and multiple drum with universal or roller fairleads.

★ **BULLDOZERS**
Tough and rugged design for standard makes of tractors.

★ **TRAILBUILDERS**
Adjustable angle-blades for standard tractor mounting.

★ **RIPPERS**
Available in light, medium and heavy duty models with two sizes to each model.

DISTRIBUTOR SALES & SERVICE FACILITIES IN ALL PRINCIPAL AREAS & FOREIGN TERRITORIES

Bituminous-Concrete Runways on Macadam

(*Continued from preceding page*)

isher, and rolled by a Galion 10-ton tandem roller.

The gradation of the hot-mix using slag and slag screenings was as follows:

Sieve Size	Slag Per Cent Passing	Screenings Per Cent Passing	Mix 33% Slag 67% Screenings	CAA Spec.
¾-inch	100	....	100	100
½-inch	77.7	....	92.64	82–100
⅜-inch	47.6	....	82.7	70–90
No. 4	8.4	100	69.77	55–79
No. 10	1.1	84.1	56.71	40–67
No. 40	....	42.0	28.14	17–44
No. 80	....	24.0	16.08	9–29
No. 200	....	10.5	7.04	3–8
Asphalt,	120-150	penetration	9.3	8–10

The pavement was then topped with a liquid seal consisting of 0.25 gallon of RC-2 80 to 120-penetration asphalt to the square yard and covered with 10 pounds of slag chips graded as follows:

Sieve Size	Per Cent Passing
¼-inch	100
No. 4	70-100
No. 10	0-70
No. 40	0-5

The chips were thoroughly rolled by the 10-ton 3-wheel rollers and any loose material was swept off to the sides of the runway.

With this final touch the runways, on which work had begun nearly seven years earlier, were ready for flying. However this year, during the construction of the airport, a four-motor bomber made an emergency landing on one of the runways, which at the time had only 2,000 feet of macadam in place. The bomber remained at the field for three weeks until the runway was built long enough for a safe take-off.

Quantities and Personnel

The major items included in this contract were as follows:

Excavation	200,000 cu. yds.
Vitrified-clay pipe, 6 to 21-inch	37,000 lin. ft.
Sub-base material	166,340 sq. yds.
Dry-bound macadam	37,670 cu. yds.
Prime coat	58,760 gals.
Aggregate for hot-mix	18,950 tons
Bituminous material for hot-mix	990 tons
Bituminous seal coat	33,580 gals.
Cover aggregate for seal coat	920 tons
Concrete pavement, 9-inch apron	3,330 sq. yds.

The contract price on the 1945 work was $644,735, the low bid of the Warren Bros. Roads Co. Of this amount $248,295 was sublet to A. S. Wikstrom for the grading and drainage only, and work got under way on April 16. With a force averaging 90 men this phase of the work was completed by August 18, despite 19 days of rain out of the first 30 worked, and intermittent rains throughout the spring and early summer. Warren Bros. used an average crew of 75, including truck drivers, and had the sub-base and macadam in place ready for the black-top paving by August 1. The runway paving was completed in the fourth week of October, despite 10 inches of rain during September, an all-time record for that month which averages 2 to 3 inches.

W. E. Kline is Regional Administrator of the Civil Aeronautics Administration, Department of Commerce, and R. M. Brown is Chief, Airways Engineering Branch. Warwick C. Thomas was Resident Engineer for the CAA, and Charles J. Carter, Resident Engineer for Ohio County. H. J. Osborne was Superintendent for A. S. Wikstrom, the grading contractor. For the Warren Bros. Roads Co., Fred G. Baker was Engineer, J. W. Hudgens was Superintendent, and E. E. Jackson, Supervisor at the asphalt plant.

Construction by the State Road Commission of West Virginia of a 28-foot slag-base black-top road 2 miles long from State Route 2 to the airport will improve the approach. This includes a new widened bridge over Short Creek built by state convicts. The steep hills up which this road climbs result in about 300,000 yards of earth to be moved.

Davey West Coast Outlet

The distribution of the Davey line of air compressors in the northern half of California is to be handled by the sales organization headed by S. Herbert Lanyon of San Francisco, the Davey Compressor Co., Kent, Ohio, has announced. Serving as direct factory agent, Mr. Lanyon, assisted by C. B. Smith, will supervise dealer activities in the area north of San Luis Obispo, Kern, Mono, and Inyo Counties.

Spatter in Welding Resisted by Paste

Of interest to those charged with equipment maintenance is the announcement by General Electric of two new compounds for offsetting spatter in electric welding. Furnished in powder form, ready for mixing with water, the compounds are applied to the work surface to resist weld-spatter.

Compound 9951 is non-adherent, and can be removed readily with an air hose or dry cloth. Number 9952 is semi-adherent and is removed by a damp cloth or direct stream of water. Both compounds are inert and cannot burn or smoke. They are applied in paste form with an ordinary bristle brush. One gallon will cover from 450 to 750 square feet of work, depending on the thickness of the coat applied.

These spatter-resistant compounds are available at distributors. Further information may be secured by writing the Electric Welding Division of the General Electric Co., Schenectady, N.Y.

ROSS SNOW PLOWS

Ross Snow Plows with scientifically designed Moldboards will move more snow with less power than any other. They are "Burch Built" for hard service and are always ready when needed.

Manufactured by

THE BURCH CORPORATION

Crestline, Ohio

Equipment since 1875

IT'S COMING!
Galion
THE NEW NO. 402 MOTOR GRADER
We enter 1946 with confidence and reaffirm our faith in mankind. The picture has changed considerably for all of us and the new year seems brighter than ever. Taking advantage of its war experience when an enviable record was made, Galion enters 1946 with a new line of redesigned and improved motor graders and rollers. This No. 402 motor grader, merely indicated above, is just one of the new models to carry the well-known Galion name plate, your guarantee of the best in road machinery, into the new year.
The Galion Iron Works & Manufacturing Co.
Main Office and Works
GALION - - - OHIO

A single Safe-Line wire-rope clamp (shown in insert) performs heavy-duty service on equipment of Michigan Power Shovel Co., Benton Harbor, Mich.

New Wire-Rope Clamp Safer, Time-Saving

An improved method of holding wire rope, the Safe-Line wire-rope clamp, is designed as a safety and time-saving factor in the construction field. In such heavy-duty service as handling long I-beams and big girders and in fastening wire rope, it supports loads up to 23 tons safely. The National Safe-Line wire-rope clamp has never slipped in the many tests made, and will outpull the strongest rope, according to the manufacturer.

This method of holding wire rope eliminates splicing and serving, and requires only one-fourth the time necessary to make a U-bolt application. It is stated that one Safe-Line clamp usually does the job of the customary three or more U-bolts. The use of this clamp saves wire rope as well as workmen's time by minimizing rope or sling breakage. This is accomplished by the equal distribution of pressure on the rope over a large area which does away with cutting action. The powerful grip results from double spiral splines that fit each wire and strand. This clamp is also designed to make it easier to lock a thimble in tight position.

Made of high-tensile-strength alloy-steel forgings, Safe-Line wire-rope clamps are master-coined to fit rope sizes from 1/16 to ¾-inch. They are simple to adjust, as the rigging stretches and can be used over and over again. No special tools are required to install them. Safe-Lines carry a replacement guarantee against breakage or fracture, and are approved by wire-rope manufacturers, Underwriters' Laboratories, Inc., and the Civil Aeronautics Administration.

Complete information may be secured by writing the National Production Co., Safe-Line Division, 4559 St. Jean Ave., Detroit 13, Mich., and mentioning this notice.

How Many in Your State?

A recent issue of *Auto Club News*, published by the Automobile Club of Missouri, carries a list of the agencies in Missouri which are beginning to make themselves heard regarding their desire for improved rural roads. There are 1,985 agencies of the sovereign state of Missouri engaged in planning or improving rural roads. Those agencies are: the State Highway Commission, 111 county highway commissions, 345 townships, 847 special road districts, and 682 common road districts. The counties, townships, and road districts spend about $9,000,000 per year on 83,552 miles of rural roads which equals only about $108 per mile.

In commenting on this problem, *The Construction Advisor* points out that, in addition to that mileage, there are 17,000 miles of primitive or absolutely unimproved roads. In order to get a clearer picture of this situation, *The Construction Advisor* creates "an average county" which would have 732 miles of road and would have, for construction and maintenance, about $79,000 a year. With the money available, large as that sum appears when applied to the whole state, not very much can be done. Actually the counties have been spending 68 per cent of their road money on maintenance and only 32 per cent on construction. Townships spend 90 per cent of the money allotted to them on maintenance and only 10 per cent on construction. This may be compared with the money spent on state roads where 20 per cent goes for maintenance and 80 per cent for new work.

Briggs Filtration Co. Absorbs Clarifier Firm

A new organization, the Briggs Filtration Co., has been chartered under the laws of Maryland to take over the patents, processes, and trade names of the Briggs Clarifier Co. All officers of the new firm served with the old company. They are Chase Donaldson, President; S. W. Briggs, Vice President; R. C. Zschiegner, Treasurer; W. E. Furey, Secretary-Counsel; and Cecil M. Hopkins, Assistant Secretary. Nearly all the personnel of the older firm have been retained.

The Briggs Filtration Co. will continue to design and manufacture the line of oil filters developed by its predecessor. The addition of new products is also planned. Activities will continue in two modern plants on River Road and the B & O RR in Bethesda, Md.

There IS a Reason
Gar Wood—World's Largest Manufacturer of Truck and Trailer equipment—earned this leadership through ability to engineer and build units of such outstanding performance that men who know equipment best specify Gar Wood.
BUY VICTORY BONDS
GAR WOOD INDUSTRIES, Inc.
DETROIT 11 MICHIGAN
Other Products: • TANKS • HEATING EQUIPMENT • MOTOR BOATS

TRANSITS and LEVELS
HEADQUARTERS for REPAIRS—any make
We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.
Write for new Catalog CE-21 of Engineering Instruments, Engineering Field Equipment and Drafting Room supplies.
WARREN-KNIGHT CO.
Mfrs. of Sterling Transits & Levels
136 N. 12th St. • Philadelphia, Pa.

This section of the new Spiratube tubing for ventilating systems shows its flexibility. Such sharp turns are made with only slight reduction in free air area, it is stated.

Tunnel Ventilation By Flexible Tubing

A portable or semi-permanent system for ventilation on tunnel jobs, or for any handling of air, gases, or light solids, is provided by a new type of flexible tubing developed by the Spiratube Division of the Warner Brothers Co. The new product, retractable to about one-eighth of its extended length, is non-collapsible.

Spiratube has a spring steel helix core which causes it to spring out, in jack-in-the-box fashion, to its full length. It will remain in position whether working on pressure or suction. The spring core is spiral-stitched within the fabric, so that the inside surface is free of wire ridges, providing less resistance to air flow.

Long-fibre duck with a bursting strength of 170 psi is used in the standard Spiratube. This fabric is processed with a fire-resistant substance and covered with tough durable thermoplastic. Spiral-stitching is done with a double seam of rot-proofed thread.

Sharp bends are possible with Spiratube without much reduction in air flow or the use of elbows or special fittings. The tubing comes in standard diameters from 3 to 16 inches, and in lengths of 10, 15, and 25 feet. Built-in couplings permit quick joining or disconnecting.

Readers of CONTRACTORS AND ENGINEERS MONTHLY may procure a bulletin on Spiratube by mentioning this article when writing to the Warner Bros. Co., Spiratube Division, Bridgeport 2, Conn.

221 PARSONS TRENCHLINER

STRONG TELESCOPING BOOM LOCKS SECURELY

Boom locks securely at points of adjustment, simplifies major trench depth adjustments on the new Parsons 221 Trenchliner. Adjustments of 1 foot or more up to the 8 foot maximum digging depth of the 221 Trenchliner, are easily made. Only 4 bolts are involved in any change.

NEW 221 TRENCHLINER CATALOG JUST OUT!

PARSONS COMPANY

KOEHRING SUBSIDIARY NEWTON, IOWA

TRENCHING EQUIPMENT

Grace is ready to help you on the big job ahead in 1946 with Sweepers built to fit your needs . . . cleaning road base prior to applying asphalt . . . sweeping streets . . . or for airfield construction work. Above is the Grace 2-way axle-driven sweeper. Others available in motor driven or front end tractor types.

The Grace Rapid Fire Circulating Heater for tank cars of asphalt is another MUST for speedy and economical construction jobs. Flue construction provides positive circulating and prevents burning or overheating of asphalt. Pumps up to 250 GPM and maintains temperatures up to 450°.

Stabilized surfaces are easily and smoothly compacted with the Grace Pneumatic Roller. Built with a low center of gravity, keeps load close to ground and eliminates tipping. Plenty of room for ballast, allowing a wide variety of pressures. Constructed with 10 tires and oscillating axles.

OTHER GRACE EQUIPMENT TO HELP YOU DO A BETTER JOB IN 1946 INCLUDES: *Sheepsfoot Rollers, 600-Gallon Maintenance Kettle, Drag Brooms and Garbage Collection Bodies.* WRITE TODAY FOR FULL DETAILS.

W. E. GRACE MANUFACTURING CO.

6005 SOUTH LAMAR STREET DALLAS, TEXAS

Shoulder and Hot-Mix Aggregate Production

Large Plant With Three Crushers Set Up by the Warren Northwest Co. to Produce Two Aggregates

TO provide crushed gravel, from ¾-inch down, for a 2-foot widening strip on each side of 1.33 miles of an existing bituminous pavement and for a hot-mix leveling course and wearing surface on the entire 6.51-mile project, the Warren Northwest Co. of Portland, Oreg., set up a complete aggregate-production plant 1.6 miles from the east end of the job.

The gradation of the 4,000 cubic yards of shoulder material and 12,000 tons of aggregate for the hot-mix was as follows:

Rock Shoulder Material

	Per Cent
Passing a ¾-inch sieve	100
Passing a ¼-inch sieve	30-50

Aggregate for Class B Asphaltic Concrete

Passing ¾-inch sieve	100
Passing ¾, retained on ¼	26-38
Passing ¼, retained on No. 10	22-30
Passing No. 10, retained on No. 200	25-35
Passing No. 200	4-7

A further requirement was that the material passing the No. 10 sieve, after the addition of collector dust and mineral filler, should meet the following gradings:

	Per Cent
Passing No. 10, retained on No. 40	30-50
Passing No. 40, retained on No. 80	16-32
Passing No. 80, retained on No. 200	16-32
Passing No. 200	8-16

Material from the river deposit 1.6 miles from the east end of the job was stockpiled in three sizes, ¾-inch down in one pile, ¾ to ¼-inch in another, and ¼-inch down in the third, with the final proportioning to specified grading being done at the hot-mix plant erected immediately adjacent to the stockpiles.

Working the River Bar

The gravel to be utilized lay in a bar along the south side of the Santiam River channel and was quite uniformly graded, with few particles larger than 4 inches in diameter. It was fairly hard, however, having a Los Angeles rattler-test loss of less than 20 per cent. A P&H 225 dragline with a 35-foot boom and ¾-cubic-yard bucket was used to sidecast the material onto the south bank of the river. There it was picked up by a 7-cubic-yard LeTourneau Carryall pulled by a Caterpillar D7 tractor, and transported along the river bank several hundred feet to the point where a loading bulkhead had been erected. This structure was built of 2 x 12-inch horizontal sheeting forming a wall 12 feet high supported by 8 x 8-inch posts, set at 4-foot centers and knee-braced at two points 5 and 10 feet above the ground. A D7 tractor with a LeTourneau bulldozer pushed the material deposited by the Carryall against the bulkhead. It was fed by gravity to a 30-inch Universal eccentric feeder, set in a tunnel in the sloping bank, and driven by a U. S. 3-hp electric motor having speed variations from 109 to 434 rpm.

Screening and Crushing Plant

The feeder deposited the gravel on a 30-inch x 60-foot belt conveyor driven by a 15-hp electric motor, which carried it to a 3 x 10-foot Symons shaker screen mounted on a 10-yard-capacity steel bin. This shaker, equipped with 1½ and ¾-inch screens, fed the oversize material to a 15 x 36-inch Universal jaw crusher set below and somewhat to its right, which was driven by a Caterpillar D8800 diesel engine. Material passing the ¾-inch deck fell into the bin whence it was hauled to the stockpile of ¾-inch-minus material. Material passing the 1½-inch screen on the top deck and retained on the ¾-inch screen of the lower one could be fed into a 36-inch Telsmith gyratory crusher set with a fine crushing concave and driven by a Caterpillar D13000 engine, or, as was more usually done, by-passed the crusher and went direct to the second screening plant.

The product of both crushers, which were set side by side next to the first steel bin, dropped onto a short conveyor dumping at right angles on a 100-foot x 30-inch belt driven by a 15-hp electric motor. This carried the material south and elevated it to a 5 x 10-foot Simplicity vibrating screen set over a two-compartment 25-cubic-yard steel bin. The ¾ and ¼-inch screens were so arranged that material below ¼-inch was sent into one compartment, that between ¾ and ¼-inch into the second compartment, and the oversize went to a second 36-inch Telsmith Gyrasphere, this one, however, equipped with a coarse crushing concave and driven by another Caterpillar D13000 engine.

Crushed gravel from this gyratory dropped on a 24-inch conveyor belt, 62 feet long, which, driven by a 5-hp electric motor, carried the material north again to a 3 x 6-foot Simplicity shaker, driven by a 3-hp electric motor, whose single deck separated the material into plus and minus ¾-inch sizes. Stone

(*Concluded on next page*)

C. & E. M. Photo

This crushing and screening plant, with a 91 to 93-cubic-yard average hourly production, was set up by Warren Northwest Co. to furnish aggregate for widening and hot-mix resurfacing on Oregon State Highway 20.

Bethlehem Guard Rail

Today, with steel guard rail an important part of so many highway programs, you'll find the Bethlehem line hard to beat.

When a runaway vehicle leaves the pavement sidewise—as happens in most accidents—there's a lot of safety in a Bethlehem Cable Guard Rail, mounted on Bethlehem Steel Guard Posts with Bethlehem Guard Brackets. The standard Bethlehem guard is made of durable, double-galvanized ¼-in. 3-strand cable, good for years of service. Properly-driven Bethlehem Guard Posts resist impact and side-thrust as well as, or better than, other kinds of posts. And the Bethlehem Highway Guard Bracket, which is made of high-tension spring steel, holds the cable and takes up much of the shock. When a one-piece guard rail is desired, there's the Bethlehem beam-type Safety-Beam rail, which no car can break through. Tough and smooth, it is made in standard lengths of 12 ft., 6 in., or can be supplied in lengths up to 50 ft.

These Bethlehem products are rugged and economically-designed—built to last, as are all of Bethlehem's line of highway steel products.

By ordering all the steel needed for a highway job from Bethlehem you'll get quick, reliable service—service that will save you money, paper-work and the possibility of idle men and equipment. It will pay you to buy steel from Bethlehem, for the big jobs ahead!

Bethlehem Safety-Beam Guard Rail

BETHLEHEM PRODUCTS FOR HIGHWAYS

Road Joints • Center Strip • Dowels Dowel Bar Supports • Reinforcing Bars Bar Mats • Bar Ties • Reinforcing for Concrete Pipe • Bridge Floor Reinforcing Concrete Slab Spacers • Welded Wire Fabric Guard Rails • Guard Posts and Brackets Wire Rope and Strand • Right-of-Way Fence and Posts • Anchor Rods • Pipe Hollow Drill Steel • Digging Bars • Structural Steel • Corrugated Sheets • Turnbuckles • Tie Rods, Spikes, Bolts and Nuts • Timber Bridge Hardware • Sheet and H-Bearing Piling

Full information about the Bethlehem line of road steels, in our new illustrated catalog, "Steel for Highways," available through the nearest district office, or from Bethlehem Steel Company, Bethlehem, Pa.

★ BETHLEHEM STEEL ★

Shoulder and Hot-Mix Aggregate Production

(*Continued from preceding page*)

above ¾-inch discharged into the fine-crushing Telsmith previously mentioned, while material passing the ¾-inch screen fell on the belt under the two side-by-side crushers for recirculation to the screens over the south bin.

Two Chevrolet trucks with 4-cubic-yard steel dump bodies kept the 91 to 93-cubic-yard average hourly production from the plant distributed to the three stockpiles between the plant and the site of the asphalt mixing plant. These trucks, loading at the steel bins at the north and south ends of the plant, drove up the sloping side to the stockpiles and dumped their loads over the edges of the flattened tops.

Electric Power Plant

To furnish the electric power required to operate the conveyor and screen motors the contractor placed a Caterpillar D13000 engine, direct-connected to a 440-volt 125-ampere generator, in a shed erected just west of the plant. One central control board was installed on the side of the shed towards the plant, and through this control board one operator was able instantly to stop any or all of the conveyor belts or screens in the event of overloading, choking, or accident.

Contract and Quantities

This contract included the addition of 2 feet of widening on each side of 1.33 miles of the existing bituminous pavement on the South Santiam Highway between Albany and Cottonwood Corners, Oreg., the placing of a leveling course averaging 1 inch in thickness over the entire 6.51-mile project, the covering of both old pavement and widening with a 2-inch-thick wearing surface, and the construction of new gravel shoulders 5 feet wide and 3 inches thick to the grade of the new surface.

The major items of the contract for which this aggregate production was performed were:

Side trenching for widening	1.33 miles	
Class B asphaltic concrete in base and leveling course	3,500	tons
Class B asphaltic concrete in wearing course	9,300	tons
¾ to 0-inch material in shoulders	4,000	cu. yds.

Personnel

This contract for resurfacing on Oregon State Highway 20 was awarded on March 13, 1945, by the Oregon State Highway Commission to Warren Northwest Co. of Portland, Oreg., for completion before July 31, 1945. A. J. Horton was superintendent for the contractor, with M. L. Stoddard, Plant Foreman on the aggregate production. For the State of Oregon the work was done under the direction of Division Engineer F. D. Eason of the Salem Division Office. R. H. Baldock is Chief Engineer of the Oregon State Highway Commission.

New West Coast Dealer Seeks Machinery Accounts

The Ace Supply Co., 170 Russ St., San Francisco, Calif., is a new equipment distributor which is seeking non-competing lines of road machinery, construction equipment, and supplies to represent in the Golden Gate area. D. R. Petrie, General Manager for Ace, reports that the owners have valuable experience and the necessary finances. At the present time this organization is handling equipment from war surplus stocks until contracts are signed with manufacturers.

This modern asphalt-laying unit of the Griffith Co., Los Angeles, served by a three-axle Model WA-26 White Super Power truck and employing a crew of three, can spread "hot stuff" at the rate of 800 to 1,600 tons a day.

» » For HOSE
BOOTS, CLOTHING or
PUMP DIAPHRAGMS
Call YOUR Continental BRANCH
Immediate Delivery from Local Stock
BRANCHES

Baltimore	Indianapolis
Boston	Kansas City
Buffalo	Los Angeles
Chicago	Memphis
Cincinnati	Milwaukee
Cleveland	New York
Dallas	Philadelphia
Dayton	Pittsburgh
Detroit	Rochester
Evansville	San Francisco
Hartford	St. Louis
• Syracuse	

See our catalog in Sweet's
CONTINENTAL RUBBER WORKS
ERIE, PENNSYLVANIA, U•S•A

AMERICA NEEDS ITS FASTEST TOOLS Now!
...Tools like Barco Portable Hammers that have proved their efficiency and economy. Reports from every field of industry show owners' enthusiasm for the ready adaptability of this rugged, many-purpose tool. Barco Portable Gasoline Hammers are powered with air-cooled, two cycle, single cylinder engines. Put Barcos on your job for more speed. Don't hestitate to ask for full details.
BARCO
Portable Gasoline HAMMERS
BREAKING
TAMPING
DRIVING
DRILLING
DIGGING
FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY
Barco Manufacturing Company, Not Inc., 1818 Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Can.

Moving Big Loads On State Highways

The Effect of Extra Length, Width, and Height on the Movement of Traffic, and Possible Damage to Bridges

+ CONTRACTORS moving their own equipment or bulky machinery over the highways to a job must bear in mind the effect of unusual length and width of the load on passing traffic, and be governed by the legal limits set by law for these dimensions as well as the weight of the load. Height is a dimension not always covered by law, so anyone moving an unusually bulky load must satisfy himself that the vertical clearance in underpasses and on bridges is sufficient.

During the war, the transportation crisis necessitated the shipment of much emergency goods and machinery over the highways by contract haulers. Larger trucks and an assortment of odd-shaped vehicles were produced to handle emergency shipments. In many cases, the physical dimensions of the highway were used to the limit. While this type of traffic was an outgrowth of the war and has been largely curtailed since the end of the war, a certain amount of it will be found on the highways for a long time to come. Drivers of such vehicles, and all other vehicles, should be aware of the hazards inherent in this type of highway movement.

Size and Weight

The limitations as to size and weight of vehicles permitted to operate over the state highway networks are specified in legislative acts. These limitations were generally liberalized by the state legislatures during the war by amendments permitting operation of longer and heavier vehicles.

Vehicles exceeding the maximum size or weight may not be operated over state highways except in emergencies, and then only by special permission from the proper authorities. Persons desiring to make any such movement must submit an application in writing showing good cause.

Large Vehicles in Traffic

As the size or weight of vehicles approaches legal limits or when vehicles exceeding the limitations are operated with a special permit, they may become difficult for operators to maneuver in traffic, and passing vehicles are also affected by the large vehicles.

Drivers of extra-long vehicles find it necessary to allow for the extra length, especially in making turns and in passing other vehicles. Drivers of other vehicles may be delayed while extra-long vehicles negotiate turns, and it is of utmost importance that they allow sufficient time and space in passing them. When vehicles are over-width, projections are usually marked with flags, and at times flagmen are required to accompany the vehicles. This protection is usually sufficient on the open highway, but when the over-width vehicle enters a bridge or underpass where space is definitely limited, accidents sometimes occur. The necessity for giving a wide berth to such vehicles sometimes causes drivers of passing vehicles to drive off the pavement and lose control of their cars.

While extra-heavy vehicles may not create any hazards due to their dimensions, their characteristically sluggish movement in traffic may bring about unexpected situations. Unless braking power is ample, drivers may not be able to halt a vehicle accurately at required stops, or if heavy vehicles are equipped with air brakes, they may make a very sudden stop. Their slowness in accelerating after a stop is annoying to drivers of other vehicles and may cause traffic snarls. On hills, it may be necessary for them to operate in low gear, thus holding up a line of passenger cars behind.

There is no legal limitation on the height of loads that may travel over most state highways. The shipper is responsible for the safe transit of a high load and if in any doubt as to vertical clearances he should drive over the desired route and measure any questionable clearances. In Illinois, the present design standards call for 15 feet of vertical clearance at through-truss steel bridges and 14 feet at subways, but many of the older structures on the state highway system have less clearance. This is equally true in other states. High loads may limit the safe distance of passing cars or may block traffic by becoming wedged beneath overhead structures.

High Load Wrecks Bridge

A striking example of the hazard involved in transporting a high load is recorded in a recent issue of the *Illinois Highway Bulletin*. This high load caused a serious accident last summer in the southern part of the state. The circumstances under which the accident took place illustrate the devastating effects of unexpected events and emphasize the necessity for the use of utmost precaution in connection with the movement of oversize loads over state highways.

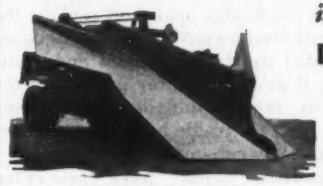
A movement of heavy oil-field equipment was to be made over approximately 20 miles of Illinois state highway. It was unnecessary for the shipper to obtain a special permit for the movement, as the weight and dimensions were well within the legal limits. However, the equipment, when loaded, extended high above the truck and it was

(*Concluded on next page*)

BRILLIANT PERFORMANCE EVERY TRIP OUT

is Assured by

DAVENPORT-FRINK SNO-PLOWS



ALL TYPES AND SIZES

No matter what the snow or ice conditions, you obtain FASTER • SAFER • CLEANER snow removal with the lighter, yet stronger, DAVENPORT-FRINK SNO-PLOWS. Available in "V" and Straight Blade types for all sizes of trucks, tractors, road patrols and locomotives. Once you see them at work, you know why they are engineer-preferred throughout the snow belt.

DAVENPORT BESLER CORPORATION Dept. A DAVENPORT, IOWA

Made in Eastern U.S.A. by CARL H. FRINK. 1000 Islands, CLAYTON, NEW YORK

What **TYPE OF ERIE AGGREMETER** *meets your needs - -*

THE ERIE line of AggreMeters is in production. It is broad to meet the varying needs of concrete producers, material dealers and contractors. From the standardized line of "GA" portable bins in 36, 52 and 68 yd. capacities to the largest of central systems to handle both aggregates and cement, Erie builds a complete line.

Erie builds AggreMeters with 2 to 9 compartments, with compartments for aggregates and cement or with separate cement bins. Weighing AggreMeters or batchers are built with weighing beams or dial scales in sizes for any mixer from ¾ to 5 cu. yds.

Write for the Erie booklets that help you to select the right plant.

Consult with Erie engineers whose background of over 25 years of application experience can help to modernize your central concrete plant or bin storage facilities.

ERIE STEEL CONSTRUCTION CO.
ERIE, PENNSYLVANIA

ERIE STEEL CONSTRUCTION CO.
261 GEIST RD. • ERIE, PA.

Please send me a copy of the booklets checked:

- ☐ • Type GA Portable with 1 to 2 yd. AggreMeter.
- ☐ • Type CTB 3 Compartments - Permanent with 3 - 4 or 5 yd. AggreMeter.
- ☐ • Type CAB 3 Compartments - Semi-Portable with 1 to 2 yd. AggreMeter.
- ☐ • Type CTC 4 Compartments - Square type with 2 to 5 yd. AggreMeter.
- ☐ • Type CTE 4 Compartments - in line with 1½ to 5 yd. AggreMeter.

ERIE
AGGREMETERS
BUCKETS ★ TRAVELING CRANES
PORTABLE CONCRETE PLANTS

Moving Big Loads On State Highways

(*Continued from preceding page*)

the responsibility of the shipper to make sure of his vertical clearances. When the shipment was being made, it consisted of two trucks, a lead truck transporting a large pump and a second truck hauling rods and tubing.

As these trucks were traveling west on Route 15 east of Fairfield, they entered a bridge without checking the vertical clearance. The top of the pump caught on the bridge portal and broke loose from the truck, which proceeded without its load. The impact of the pump carried the portal framework past the first vertical steel members, bending the steel angle in the shape of a hairpin and pulling the end posts together and forward in such a way that they lost their supporting strength. This allowed the end of the bridge to sag and drop to the ground as the second truck came upon it. The pump had remained suspended from the framework overhead but when struck by the second truck it dropped upon the cab. At the same time the cargo of rods and tubing was thrust violently forward through and over the cab. The driver was critically injured and his helper was killed instantly.

The effects of this accident were disastrous to highway transportation as well as to those involved. Seventeen miles of highway, costing over $500,000, was closed to through traffic for nine days. During this time all through traffic was forced to make an expensive detour of 38 miles. It cost a great deal to raise the bridge span and replace the damaged framework and floor. Because of critical shortages of steel and manpower, it took until after the first of the year to repair the damage, during which time all traffic had to travel over a temporary run-around.

Precaution would have prevented this accident and its disastrous results. Its only value is in the lesson that it may convey to the motoring public, particularly those who have to move bulky loads, in the avoidance of similar accidents in the future.

Hercules Appointments

J. Joseph Kelleher, Special Representative for the Explosives Department of the Hercules Powder Co., Wilmington, Del., has been appointed Manager of the Contractors' Division, with which he has been associated since joining the firm in 1929.

Charles H. Gant has been named to succeed Edward G. Crum as Manager of Hercules' Parlin, N. J. plant. During the war, Mr. Gant was Plant Manager of two of the Hercules-operated Government explosives plants.

A ONE-MAN CREW
THAT WILL **SAVE MONEY** FOR YOU

100% Self-Contained
SYNTRON
Gasoline Hammer

PAVING BREAKERS

BUSTING concrete—**DIGGING** shale and clay
CUTTING asphalt—**TAMPING**—and a host of other jobs.

Write for catalog folder

SYNTRON CO., 227 Lexington, Homer City, Pa.

MEMO

Find out today about Naylor's advanced pipe coupling methods that save time, work and money

WRITE FOR YOUR COPY OF THE NEW NAYLOR CATALOG TO-DAY.

NAYLOR PIPE COMPANY
General Office
1270 EAST 92ND STREET • CHICAGO 19, ILLINOIS
New York Office
350 Madison Avenue • New York 17, N. Y.

NAYLOR LOCKSEAM SPIRALWELD PIPE

Clamp-Splice-Tie-Mend-Reinforce
with
PUNCH-LOK
Streamlined
BANDING METHOD

Punch-Lok Clamps, quickly applied with the Loking Tool, save money and time in your production and maintenance operations. Send now for descriptive catalog and name of nearest distributor.

KEEP BUYING WAR BONDS

PUNCH-LOK COMPANY
Dept. I, 321 No. Justine St., Chicago 7, Illinois

George A. Fuller Co. has the contract for the reconstruction of the lower portion of the wood trestle carrying the Mt. Cranmore Skimobile tramway up the slope.

Skimobile Trestle

(Continued from page 1)

upper section continues on for 2,000 feet with a vertical rise of 620 feet and a maximum grade of 38 per cent.

Two years ago the upper section was rebuilt entirely of timber but last autumn, when the end of the war made construction material again available to private enterprise, Cranmore Skimobile Inc., operator of the tramway, decided to replace the lower section of the wooden trestle with a creosoted-timber structure resting on concrete foundations and with steel runners for the track. In addition, the wooden platform at the foot of the tramway has been replaced with concrete slabs, and a new two-story and basement clubhouse or ski-base building of reinforced concrete and steel has been constructed alongside the platform.

On the trestle are two runways, one for cars ascending the mountain, and a parallel runway for descending cars, the correct name for which is Cranmore Mountain Skimobile, since these cars are a patented device and operate on the only tramway of its kind in the world.

North Conway is located on U. S. 302 and State Route 16 in northeastern New Hampshire in the heart of the White Mountains where snow comes early and stays late. Mt. Cranmore lies ¾ mile east of the town, and from its summit can be seen, 12 miles away, Mt. Washington, the highest of New England's peaks. Because of the northern latitude and the early arrival of winter, only the lower 1,600 feet of the first section of trestle was built in the autumn of 1945, along with the clubhouse, since frozen ground would make excavation for the foundations well nigh impossible if the work were attempted beyond the middle of December. In the spring the remaining 1,200 feet of trestle and a concrete platform at the half-way mark of the tramway will be constructed.

New Foundations

The old trestle had bents made of two 6-inch posts on 10-foot centers with a span of 14 feet between bents. The posts were without foundations, being stuck a few feet in the ground, and supported a wooden framework on which the two 38-inch-wide wooden runways were built. On each runway were two tracks made from 1 x 10-inch boards to serve as runners for the wheels of the cars which have a gage of 21 inches. At the center of each track was a 3-inch slot for the ⅞-inch cable to which each car was connected at the front end by a steel bracket. The distance between slots is 10 feet 1 inch. The popular tramway, which gave 300,000 rides last year, was beginning to show a wavy profile from constant use, and the untreated wood from which it was fashioned was displaying signs of decay.

The new trestle has concrete foundations extending from 3½ to 4 feet into the ground, the excavation for which was done by hand with picks and shovels. Formwork for these concrete footings consisted of 1 x 6-inch boards, set vertically and braced with horizontal 2 x 4-inch studs on 18-inch centers. Two 2 x 6's on each side of the form box and one 2 x 6 at each end served as vertical wales, which in turn were further braced with 2 x 6's set against stakes in the ground. The forms were built high enough so that the concrete was poured from 6 inches to a foot above the contour of the ground.

Because of the varying height of the trestle, with a resultant different design of the bents, two types of footings are used. In all bents under 8 feet high, two footings, each measuring 3½ x 1½ feet, were built on 10-foot 1-inch centers. For trestle bents over 8 feet high, two 18 x 18-inch piers were constructed on the same centering. The new span lengths are 14 feet, the same as in the original structure.

Concrete Operations

A Rex 10-S 2-bag concrete mixer was set up at the base of the mountain, with water being supplied through a hose line from the present clubhouse which has a well beneath it. Lone Star cement was shipped in bags from a Pennsylvania plant to a siding on the Boston & Maine railroad at North Conway, and then trucked 1½ miles to the mixer. Sand and gravel for the concrete was dug by hand from the nearby creek, loaded into a 1½-ton truck, and dumped in a pile alongside the mixer, where the sand was later separated from the gravel by shoveling it through a screen.

Transporting the concrete up the steep slope of the mountain presented a real problem. No road exists nor could trucks negotiate the steep 20 per cent grade up the grassy slopes, or thread their way through a pine forest which surrounds part of the tramway. The solution was to build three sleds or boxes from 2 x 6's, 7 feet long x 5 feet wide, with board sides varying in height from 14 inches at the front to 24 inches

(Continued on next page)

Your operator can always see what he's doing on a DOZER-SHOVEL. In shovel operations he can see the bucket as it enters the digging, watch it get a full load. He can see the ground over which he must move to reach his dumping position. He can see to spot the bucket exactly where he wants it for accurate dumping. In 'dozing, the operator can see just what he's doing. There are no frames, winches, hydraulic cylinders or other obstructions to block the operator's full front vision on the DOZER-SHOVEL. That means faster, safer operating cycles day-in and day-out.

There are other features, too, which make the DOZER-SHOVEL unique. Combined with a Trac-TracTor it makes a balanced digging unit which retains all the inherent characteristics of the tractor. Ask your International TracTracTor distributor what that will mean to you. Ask him, too, about the DOZER-SHOVEL'S oscillating tracks, low clearance and other features offered by no other machine. 19T45

BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

Skimobile Trestle

(*Continued from preceding page*)

at the rear, the pitch being necessary to keep the concrete from spilling over the rear as the sleds were dragged up the mountain by a crawler tractor. The sides of the sleds were braced with vertical 2 x 4's, and with one horizontal 2 x 6.

Three sleds were used so that the concreting operations could be continuous; as one sled was being emptied by hand into wheelbarrows which were then dumped into the forms, the tractor took an already emptied sled back to the mixer, which in the meantime had been filling up the third sled with concrete for the tractor to pull back up the hill as soon as it arrived with the empty sled. In this way no time was lost and the concrete gang never ran out of material.

On top of the footings in an inch of grout were set base plates, 14½ x 8 x ¾-inch, two plates on each of the larger footings and one on the smaller footings, to serve as a smooth foundation for the bent posts.

Timber Bents

A carpenter shop was set up at the base of the hill to cut the lumber for the forms, and for assembling the timber bents which were fabricated there and then hauled up the slope by the tractor and sled where they were erected in one unit. Most of the lumber was cut by a SkilSaw using 9 and 10-inch-diameter blades, with the saw rigged up in an inverted position on a flat table and used like a regular table saw.

The trestle bents under 8 feet high are made up of two 4 x 6 posts on 2-foot centers on each of the longer footings. The two sets of posts are connected at the bottom by a 2 x 6 across the bent, and by another parallel 2 x 6, 33 inches above the bottom. The posts are held in place on the footings by ¼-inch bent plates, 3½ inches wide, with a 1-foot vertical leg and a 3½-inch horizontal leg. The plates are fastened to the footings with ¾-inch anchor bolts, while the posts are secured by ⅝-inch bolts, 6¾ inches long, running through them. All metal used in the tramway, both hardware fittings and the runners for the cars, is galvanized steel. Everything is bolted; nothing is nailed. The threads on the bolts were treated with red lead, and all wood was painted with creosote.

To deliver concrete to the footings for the new Skimobile trestle at North Conway, N. H., the contractor used a sled pulled over the mountainside by a tractor.

On the sections over 8 feet in height, a single 4 x 6 post was erected on each 18-inch square footing, with the centers of the posts being 10 feet 1 inch apart. These posts are capped with another 4 x 6 which cantilevers at each end a distance of 1 foot 10 inches. The posts are cross-braced with two 2 x 6's. On top of the cap were set four 4 x 6's to whatever height was needed to bring the bent to the desired grade.

The tops of the posts on all bents are capped with a 5/16-inch bent plate which extends 6 inches down the sides of the posts. On both sides of each post at the top are 2 x 8's which are supported by brackets, 6 x 3½ x 5/16 x 8 inches long. This spacing of the posts allows for the 3-inch slot for the cable between the 2 x 8's, the slots being 10 feet 1 inch on centers.

The bents are joined by the 6-inch steel channels on which the wheels of the car ride, and also by the 2 x 8's running along on each side of the channels. Side bracing of the bents consists of 2 x 6's on the 14-foot spans. While the footings could not, of course, be built on a smooth profile since they follow the contour of the mountain, the

(*Continued on next page*)

You can't beat

CATAPHOTE REFLECTOR SIGNS

Get highways ready *now* for the big job of traffic control ahead - - with CATAPHOTE Reflector and plain Signs. Now available. Long-life, lowest-cost permanent illumination with Cataphote Reflector Buttons No replacements needed. Order today!

CATAPHOTE CORPORATION TOLEDO, OHIO

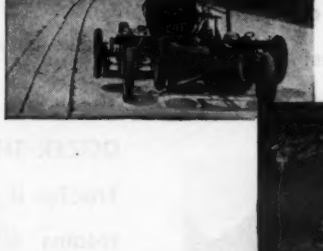
Highway Departments! Here's YOUR Mower—

THE WORTHINGTON "HIGHWAY RANGER"

It's new — designed to trim all highway grass areas — at less cost and less labor.

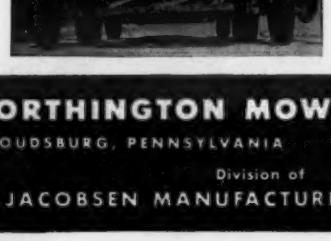
The Worthington "Highway Ranger" saves your department time and money — cuts everything from coarse grass shoulder grades to clover-leaf centers and grass on island stretches—maintains cut to the conditions you want.

The "Highway Ranger" is designed specifically to meet your varied mowing problems — embodies the same general characteristics as the famous Worthington Airfield Grass Blitzer. With the Worthington "Highway Ranger" you are not wedded to any one make of tractor or sickle-bar attachment. It can be quickly attached to *any make* of tractor, or readily "switched" from one to another.



The "Highway Ranger" takes its place in traffic, like any other vehicle, and travels from one mowing area to another at the highest recommended speed of your tractor.

The "Highway Ranger" cutting rank growth on road shoulder. The "Ranger" method offers far greater cutting capacity than the sickle-bar method.



"Ground eye" view of the "Highway Ranger" raised for transportation. Ample clearance is provided for climbing curbs and for maneuvering in tight areas and around obstructions.

Distributors in all principal cities

WORTHINGTON MOWER COMPANY
STROUDSBURG, PENNSYLVANIA *Established in 1914*
Division of
JACOBSEN MANUFACTURING COMPANY

C. & E. M. Photo
The new trestle to carry the Skimobile tramway up Mt. Cranmore in New Hampshire rests on concrete footings, forms for which are shown above.

Skimobile Trestle

(Continued from preceding page)

cross bracing in each bent was carefully set to grade so that the finished line of the tramway presents a smooth slope upwards. After the piers were in, the erection of the timber posts and their bolting proceeded at the rate of 1,200 linear feet a week. The highest point on the trestle is 22 feet above the ground.

Next spring when work is resumed on the remaining 1,200 feet of the lower section of trestle, it is expected that the mountain side will be too muddy and slippery for even the tractor to climb, so material will be brought up on the new section of the tramway. A small Rex 7-S mixer will be used right at the footings, and pulled about as required. Water for the mixer will be forced up a pipe line by a booster pump from the clubhouse below.

Structures

Work this past autumn also included the removal of the old wooden platform at the bottom of the incline, and the construction of a new concrete loading area nearly 100 feet long x 30 feet wide, affording passengers ample room for getting on and off the tramway. The turntable or huge pulley for the cable is located at the rear end of this 4-inch concrete slab, which was covered with 1 inch of sand-cement grout colored red by adding 5 pounds of coloring powder to every bag of cement.

Adjoining the loading platform is the new clubhouse or base building, 60 x 36 feet, of reinforced-concrete and steel construction, with log walls on both the inside and outside of the concrete. The excavation was done by hand, and a wooden tower, 45 feet high, was built to handle the concrete after it was deposited in a bucket from the discharge end of the mixer. The concrete was lifted to the first or second floors of the building by a National 45-hp hoist operated by a Wisconsin engine, transferred to concrete buggies, and dumped into the forms.

The basement of the building is given over to a ski shop and women's lounge; the main floor will be used as a lobby and will have a dance floor; the second or mezzanine floor will house the offices of the management and private club rooms, and will also have, cantilevered at the sides, 10-foot-wide sun decks with colored concrete floors. A feature of this story will be large plate-glass windows, 10 feet long x 4 feet 10 inches high. On each story will be an open fireplace with chimneys of native field stone built on the outside of the clubhouse.

Personnel

A force of about 40 men completed the first section of the tramway trestle and structures by December 15, so that it was ready for the official opening of the winter season on December 20. The Bethlehem Steel Co. supplied over 200 tons of steel for the construction, and the total cost of this new improvement will be about $100,000.

The Mt. Cranmore Skimobile tramway is managed by Phil Robertson. The work of the George A. Fuller Co. of New York City was directed by Peter Dejongh, Chief Engineer, with O. A. Ronlund, Superintendent.

History of the Tramway

The Cranmore Mountain Skimobile was invented by George W. Morton of Bartlett, N. H., and measures 31 inches wide x 6½ feet long. Fastened to a 6,000-foot endless steel-wire pulling cable, the length required for the lower section, the cars move along the tramway on four 1-foot-diameter rubber-

(Concluded on next page, Col. 3)

STAY IN THE LEAD

By using the

HI-WAY MODEL R MATERIAL SPREADER

Reversible transmission on both the feed roller and agitator permits changing from forward to reverse motion, or vice versa, by simply shifting a lever.

The Swivel-type Adjustable Hitch allows the Traction Wheels of the Spreader to be on the Ground at all Times regardless of what position the truck or spreader is in. Easily coupled and uncoupled.

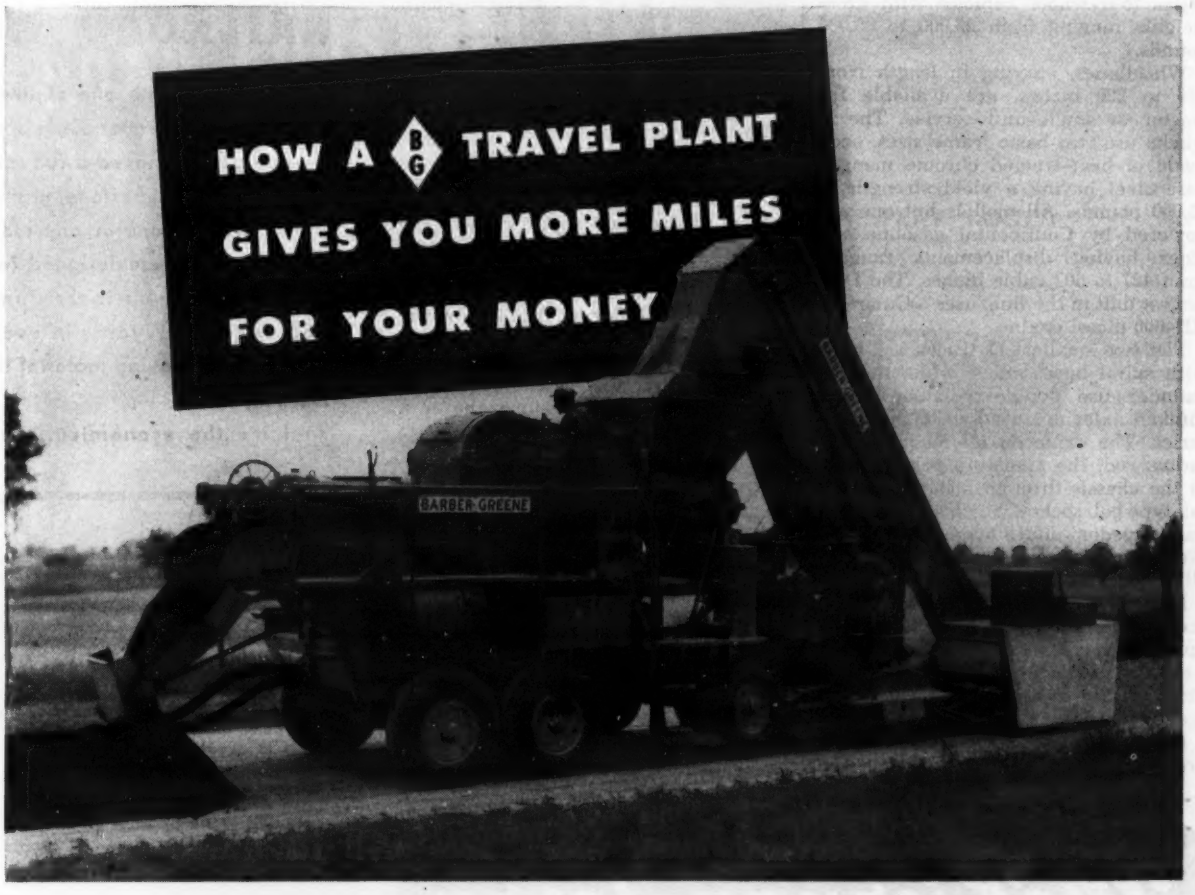
Disengaging lever for coupling and uncoupling is extended to the outside of the spreader, eliminating danger for the operator.

Sold and distributed by leading Construction Machinery Dealers throughout the United States and foreign countries.

Furnished in 6 widths— from 8 to 13 feet

Write for detailed specifications

HIGHWAY EQUIPMENT COMPANY, INC.
Manufacturers of the World's Most Complete Line of Spreaders
CEDAR RAPIDS, IOWA, U.S.A.



● Building longer lasting asphalt roads is only *one* of the ways a Barber-Greene Travel Plant gives you more for your money.

Here's how a B-G Travel Plant cuts down construction expense to help you stretch limited funds into more miles of completed highways:

*** Continuous, high quality production. No batches, no pauses. No human element to lower capacity . . . no dependence on operating skill to maintain consistency.**

*** Reduction of the weather hazard. No partially-prepared material to be spoiled by sudden showers.**

*** Full working periods. Short mixing cycle permits operation on colder days, later at night, earlier and longer in the season.**

*** No sacrifice of bitumen quality to allow for time-consuming blading. No rich or lean spots. Lower percentages of heavier and quicker-setting bitumen with less solvent produce uniformly-coated mixes.**

*** Easy job coordination. Mixing and proportioning performed by a single unit under control of two or three men. When aggregate is windrowed well ahead, it's automatically available as needed.**

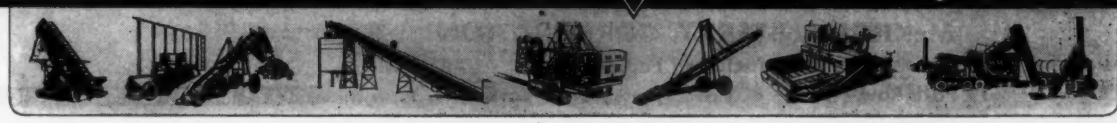
*** Low investment. Cost of the B-G Travel Plant is no more than that of the necessary machines for mixed-in-place construction of the same mileage.**

*** Versatility. Handles all types of bituminous and stabilized work. Can be centrally located for maintenance requirements . . . becomes an integral part of Central Plant set-up for production of high-type mixes.**

Write for catalogs describing how the economical operation of B-G equipment enables you to surface roads with plant-mixed material at blade-mix cost. Barber-Greene Company, Aurora, Illinois.

45-6

Barber-Greene B G *Constant Flow Equipment*



One of the post-war line of Ward LaFrance heavy-duty trucks is this four-wheel long-wheelbase model.

Heavy-Duty Trucks In 4-Wheel Models

Several basic chassis types, all incorporating the same general layout of components and sheet-metal styling, are being offered as its immediate post-war motor-truck line by the Ward LaFrance Truck Division of Great American Industries, Inc., Elmira, N. Y. Known as the D series, the line comprises four-wheel vehicles with gross weights ranging from 25,000 to 35,000 pounds.

Wheelbases, varying in length from 149 to 220 inches, are available for tractor or single-unit service. The D trucks use two basic frame sizes, each made of heat-treated chrome manganese steel having a yield strength of 85,000 pounds. All models but one are powered by Continental gasoline engines having displacements ranging from 427 to 602 cubic inches. The D-5, largest unit in the line, uses a Cummins HB-600 diesel engine.

The two smallest D trucks are built with spiral-bevel axles, while the remainder use double-reduction axles. Timken axles are used throughout the series. The drive on all models is by radius rod, the assembly being linked to the chassis through a large universal-type ball socket, which allows maximum freedom and movement. Bendix-Westinghouse brakes are standard on all vehicles in the series.

In designing the fenders, maximum accessibility has been considered. Flat upper surfaces serve as support for a mechanic while servicing the engine. The cab has a V-type windshield for greater vision.

Full details on this new Ward LaFrance line, Series D, may be secured by writing the firm at Elmira, N. Y. Just mention this notice, and ask for Form CT-845.

Atlas Promotes Frome

Weston G. Frome has been promoted from the post of Assistant General Manager to that of General Manager of its Explosives Department, the Atlas Powder Co., Wilmington, Del., has announced. He succeeds F. S. Pollock, Vice President, who has been elected a member of the firm's executive committee. Mr. Frome, in the industry since 1910, joined Atlas in 1913, and has served the firm in various executive capacities.

Directs Rototiller Sales

G. O. Britton has been named Director of Sales for the Farm Equipment Division of the Graham-Paige Motors Corp., Detroit, Mich. The firm will produce the Rototiller, a machine which prepares the soil for planting in a single operation and which is also used on road-mix and soil-cement jobs. The company will also produce the new Frazer wheel tractor and a line of farm implements at Willow Run.

Goodrich Absorbs Hycar

The acquisition of the assets and trade names of the Hycar Chemical Co., largest private producer of Nitril oil-resistant types of synthetic rubber, has been announced by the B. F. Goodrich Chemical Co. All Hycar products will continue to be produced by the new owner at the Akron plant. Headquarters will be at the firm's main office in Cleveland, Ohio.

Skimobile Trestle

(*Continued from preceding page*)

tired wheels on a 21-inch gage. Each car holds one passenger, who sits on a seat enclosed on three sides by a pipe railing.

Motive power for the tramway comes from a house located at the half-way station where alternating current is changed to direct on a 100-hp motor-generator set, which in turn drives two generators and two direct-current 40-hp motors, one for each section of the tramway. All electrical equipment is General Electric.

With this power, the cars, of which there are 120 on the lower section, spaced 50 feet apart, climb to the half-way station in a little over 8 minutes. There a transfer is made to the upper unit, having 60 cars, which climbs the steepest part of the mountain. Skiers may also get off at any of three lower platforms on the first section. The tramway can accommodate 600 passengers per hour, and during the snow season has given as many as 5,000 rides in a day, with an average of between 4,000 and 4,500 daily. Even in the summer the tramway has given 2,200 rides a day to picnickers and sightseers. The home of the Hannes Schneider Eastern Slope Ski School, Mt. Cranmore has had crowds of 8,000 at one time.

The Skimobile was financed by Harvey D. Gibson, well known international figure in financial circles and President of the Manufacturers Trust Co. of New York City. A native son of North Conway, Mr. Gibson had the tramway built for the benefit of the community and all profits deriving from the use of the ride are reinvested in further improvements.

Almquist Returns to ARBA

Norman T. Almquist has rejoined the American Road Builders' Association staff as an administrative assistant, following his return from four years' duty with the Seabees, during which time he saw considerable service in the Pacific.

McKiernan-Terry
Single-Acting
PILE HAMMERS

Hammer mechanism completely enclosed—no exposed working parts.

On jobs involving penetration of stiff blue clay, heavy "gumbo", incipient shale, hard pan, compacted gravel, or similarly dense substances, or where preformed concrete or other heavy mass piles are to be driven, McKiernan-Terry Single-Acting Pile Hammers provide heavy blows at low striking velocity, to overcome inertia and friction without excessive strain on the piling or wear on ram and anvil block. The ONLY single-acting hammer that will operate under water. Five standard sizes.

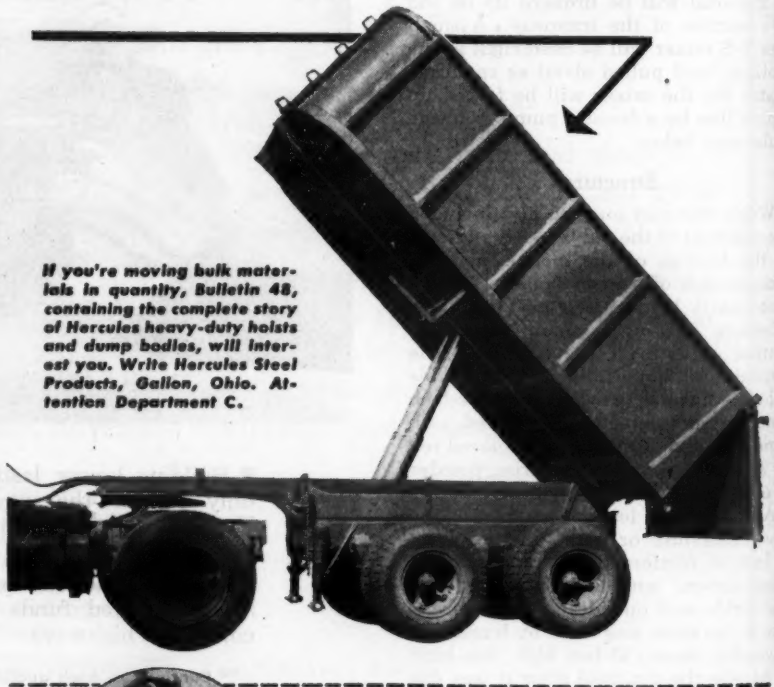
THIS NEW BULLETIN FREE
Gives full information, specifications, photos, diagrams. Write for Bulletin 57.

McKIERNAN-TERRY CORPORATION
Manufacturing Engineers
19 Park Row New York 7, N. Y.

RAILROAD WITHOUT RAILS!

Just two trips with one of these 22-ton Hercules trailer dump bodies and you've moved a full railroad carload of limestone, gravel, coal, crushed stone or any other bulk material. These designed-for-duty, built-for-business dump bodies carry 17 yards in every load—that's moving material the BIG way!

And it's the economical way, too, for one 22-ton load, moved quickly and easily in a Hercules trailer unit, eliminates numerous trips with dump trucks of lesser capacity, cuts time, labor and operating costs to the minimum. This extra capacity also makes it practical to move materials longer distances by truck, avoiding additional handlings required with combined truck-rail hauling.



If you're moving bulk materials in quantity, Bulletin 48, containing the complete story of Hercules heavy-duty hoists and dump bodies, will interest you. Write Hercules Steel Products, Galion, Ohio. Attention Department C.

Ask About Turn-O-Matic Cement Boxes for Bulk Cement—Now Available—Write Today

HERCULES
DUMP BODIES AND HYDRAULIC HOISTS
SPLIT SHAFT POWER TAKE-OFFS • COAL CONVEYORS

HERCULES STEEL PRODUCTS COMPANY GALION, OHIO

Draglines and Dredge Built New River Levee

Fill of 1,500,000 Yards Will Check Erosion of Bank by Mississippi at Morganza, La.

✦ AT Morganza, La., where the Mississippi River makes a great bend to the west, the shore line is constantly under attack by the erosive force of the mighty waters to such an extent that within the past eight years the river bank has been pushed westward from 600 to 800 feet along a one-mile front. This cutting action of the current has now advanced in some places to within 500 feet of the river-side toe of the present levee which was completed in 1933. The Hendry Corp. of Rattlesnake, Fla., under a contract awarded by the New Orleans District, U. S. Engineer Department, recently completed a new earth levee on the west bank of the river, beginning at a point on the existing levee immediately north of where the river is encroaching, and roughly paralleling to landward the older levee south for a distance of 6,400 feet. This new levee will be extended downstream under another contract to tie into an embankment which is part of the new Morganza Floodway levee system at a point about 600 feet in back of the existing levee.

Work on this new 1.2-mile levee started in October, 1944, with the construction by draglines of two parallel earth dikes, from 12 to 15 feet high, spaced about 300 feet apart on centers. The area between these dikes was then hydraulic-filled with material predominantly clay dredged from a borrow pit located riverward of the present controlling levee to form a new 30-foot-high levee which will be ready to protect the surrounding country in case the river should breach the outer embankment. A total of 1,500,000 cubic yards of material was necessary for the construction of that portion of the new levee under contract with the Hendry Corp.

Building the Dikes

The two small parallel earth dikes, constructed at the land and river-side toes of the new levee to hold the hydraulic fill, were built by two Northwest 95 draglines with 70-foot booms, one equipped with a Bucyrus-Erie 2½-yard bucket and the other with a Hendrix 2½-yard bucket. The base of these dikes varied from 50 to 75 feet in width. The dragline which built the dike on the riverward side of the new levee got its material for the lower 5,000 feet of the dike from the area available for borrow between the new and the old levee. From the river-side toe of the small dike, a flat 40-foot berm was left on which the dragline worked. Beyond this berm, going towards the existing levee and the river, the dragline excavated along a 1 on 2 slope for a depth of 3 feet, and then on a 1 on 10 slope for the remainder of the borrow. With the use of the long boom on the dragline, the earth had to be handled but once. For the remaining upper 1,400 feet of the riverward dike the fill came from an inspection ditch, 6 feet deep and 60 to 70 feet wide, along the center line of the new levee. The required dimensions of the inspection ditch were 6 feet deep and 7 feet wide, but the contractor was permitted to widen this ditch in order to get material for his dike fill. Payment, however, was made on the basis of built-up fill sections and not on excavation or ditch digging.

These inspection ditches dug in the natural ground surface within the foundation area reveal the presence of any drains going through the levee, or buried logs, trees, etc., that might weaken the structure. This ditch was also used to furnish material for the construction of the land-side dike, with needed additional fill coming from a ditch 3 feet deep x 15 feet wide, dug to drain the waste water from the outlets used during the hydraulic-fill operations. The inner edge of this drainage ditch was 80 feet landward of the land-side toe of the retaining dike. The inner slopes of both the retaining dikes were about 1 on 2, or natural repose, while the outer slopes were 1 on 3. The dragline building the landward dike worked first along the foundation, digging the inspection ditch, and then moved to the other side of the dike and dug the drainage ditch. In both excavations the material was handled but once. The dikes were built up in 12-inch layers, with two Caterpillar tractor-dozers, an RD6 and an RD7, which spread the material, supplying the necessary compaction with at least three passes over the entire surface of each layer.

C. & E. M. Photo
On the Hendry Corp. 1.2-mile levee contract the 16-inch land line for the hydraulic fill was carried over an old borrow pit on a 650-foot trestle.

Hydraulic Dredging

When 1,500 feet of retaining dike had been built on both sides, a transverse dike was built across the lower end to retain the hydraulic fill, and to prevent the separation of fines from the rest of the material. Such transverse dikes were built at 1,500-foot intervals across the levee for the length of the job. Just north of the first 8-foot transverse dike an opening was left in the land-side embankment for the run-off of the water from the dredged fill into the drainage ditch which flowed into Cowhead Bayou and thence into the Atchafalaya River. When the end of the discharge pipe of the hydraulic fill came within 400 feet of the transverse retaining dike, this embankment was breached by a dragline, and the dredged material flowed through to fill

(Continued on next page)

ROAD CONSTRUCTION AND MAINTENANCE EQUIPMENT
"SPRAY MASTER"
PRESSURE DISTRIBUTOR
"TANKAR" STEAM HEATER
MODEL NO. 108 POWER DRIVEN ROAD BROOM
Here is the Construction and Maintenance Equipment you have been waiting for—designed by engineers skilled and experienced in Black Top Construction and Maintenance requirements.
"Spray Master" Pressure Distributor has but one valve for operating the spray—has as standard equipment numerous features, called extras on similar units.
"Tankar" Steam Heater is the fastest steam producing unit made today for unloading Tank Cars of Asphalt, etc.
Model No. 108 Power Driven Road Broom is a two-way broom capable of sweeping in either direction. Hydraulic Tension Control is a Littleford Feature.
For the best Black Top Units for today and tomorrow it's Littleford—make no mistake.
LB
BLACK TOP ROAD MAINTENANCE EQUIPMENT
SINCE 1909
LITTLEFORD
LITTLEFORD BROS., Inc.
485 E. PEARL ST., CINCINNATI 2, OHIO

New River Levee

(*Continued from preceding page*)

up another 1,500-foot section of levee.

The crown of the riverward levee is at elevation 61, while the gross grade of the new levee is at 62 and the net grade at 60.5. A gross crown of 22-foot width was built which, after shrinkage and trimming, was reduced to 10 feet. The river-side slope goes down 1 on 3½ to a point 13 feet below the net grade where the levee section flattens out to a 1 on 15 slope for an 80-foot artificial berm that meets the retaining dike at its crown. The land-side slope drops at 1 on 5 to a point 16 feet below the net grade where it too flattens out on a 1 on 15 slope to form an 80-foot berm which extends to the crown of the land-side retaining dike.

Hendry Dredge No. 3

The dredge used in the placing of this hydraulic fill was the Hendry Corp.'s No. 3, a 110 x 30 x 8½-foot steel-hull craft with 5/16-inch plates. Built in 1942, the dredge has a 35-foot A-frame, and a 48-foot ladder capable of digging at a 50-degree angle with its 54-inch cutter head mounted at the end of the ladder. At the bow, port and starboard, are two 65-foot booms for the anchors which are dropped ahead of the dredge. At the stern, mounted in wells, half in and half out of the hull, are two steel cylindrical spuds, 32 inches in diameter and 55 feet long. The digging spud is at the port side while the walking spud is on the starboard.

The dredge is powered by a Cooper-Bessemer 600-hp Type JT diesel engine directly connected to the main pump which is located dead center about 25 feet from the bow. A 20-inch suction pipe leaves the ladder and is connected to the line on the dredge by a 10-foot length of flexible rubber pipe immediately behind the G-E 150-hp cutter-head motor, placed in the center of the bow.

The pump has a 70-inch shell and a four-vane 48-inch impeller. Overhead is a monorail running the length of the dredge carrying a 1-ton and a 3-ton Yale hoist which are used to lift the cover of the manhole located just in front of the pump, or the pump itself. The manhole is opened to remove logs or debris which may be carried into the suction line. From the pump a 16-inch discharge line leaves the cabin through a door on the port side and runs along the deck to the stern where it is connected to the pontoon line with a 10-foot rubber sleeve.

Auxiliary power units on the No. 3 include a Superior 210-hp diesel engine operating at 600 rpm, located behind the main engine, and which drives a 350-amp 440-volt generator. Astern of this engine are a Cummins 240-hp 900-rpm diesel which operates a G-E 150-kw generator, and an International 90-hp 1,200-rpm diesel which drives another G-E generator. All the generators are connected with and synchronized at the main switchboard on the port side of the main engine, and all power demands are supplied from there. Located behind the thrust bearing at the rear of the pump is a 200-hp electric motor connected to the main pump shaft by a 15-belt V-drive. This motor, also connected to the switchboard, can either put additional power into the main pump or else take power from the shaft, as conditions warrant. This arrangement is also possible with the auxiliary engines, but most of the time the auxiliaries are helping the main pump rather than the other way round.

The 75-hp electric swing motor also operates a 7-drum hoist, two drums of which are located forward near the bow and control the anchor booms, while the other five are back slightly in a row across the deck, with the center drum hoisting the ladder, the next two on either side handling the spuds, and the outer two controlling the swing line.

The swing line enabled the dredge to move laterally 200 feet on its cutting course into a bank of clay mixed with a little sand which had a face 20 feet high and descended to a depth of 28 feet below the existing water level. The dials in the dredge operator's cabin indicated a vacuum of 18 inches on the suction line when the dredge was pumping a load, or only 7 inches when nothing but water was going through. Pressure readings varied also from 43, when water alone was being pushed through the discharge, to 50 when material was being carried. Other gages showed the swing motor operating at between 30 and 60 amperes, while the cutter-head motor kept around 50 amperes. A circuit breaker on the cutter-head motor cuts out at 250 amperes, warning the operator that some foreign material has stalled the cutter head.

To the port side of the main engine is

(*Continued on next page*)

DREYER CONCRETE VIBRATORS

Dreyer Gas-Engine Vibrator

Breakdowns cost money . . . use a tool you can depend on. Designed for high efficiency and low upkeep. Ask the men who use them.

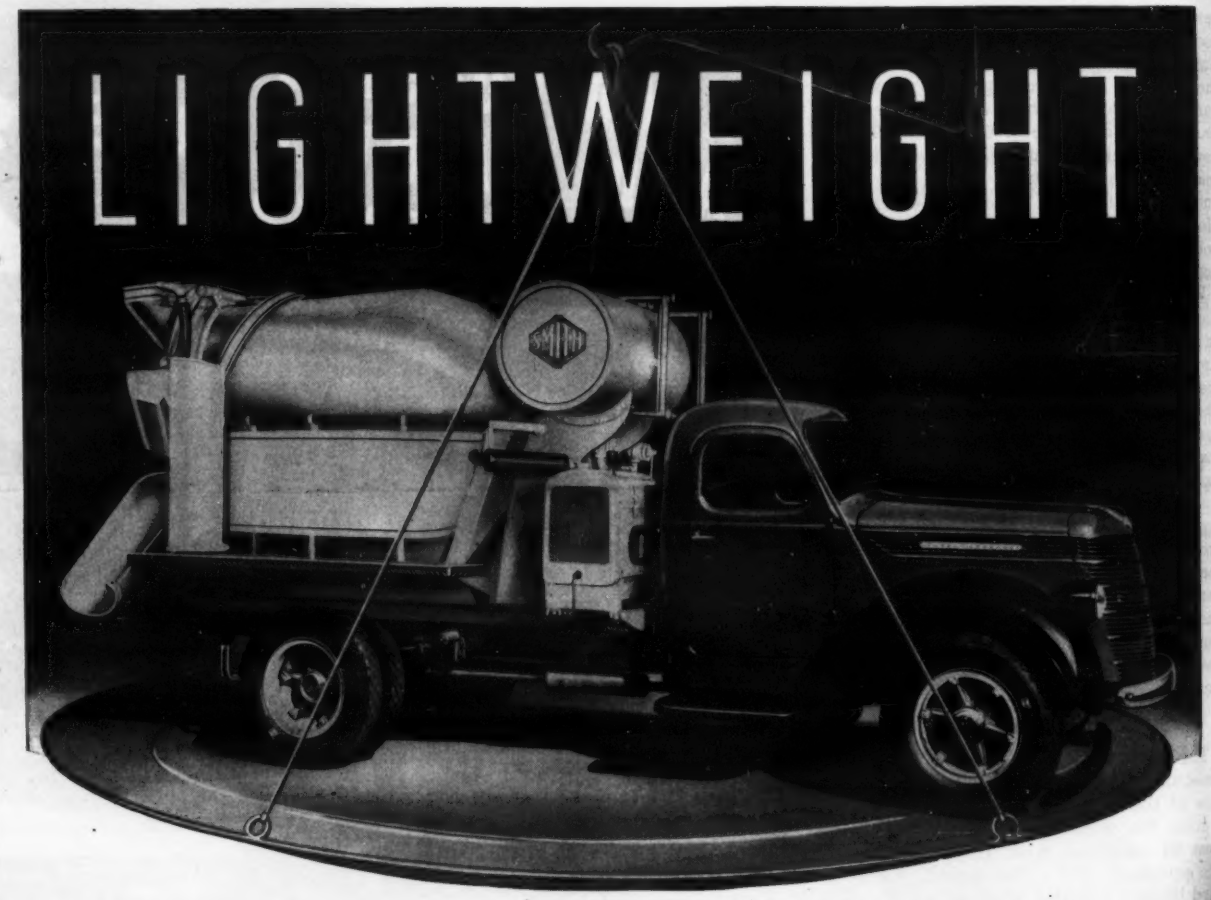
Dreyer Electric Vibrator

DISTRIBUTORS

Phoenix, Ariz., Equipment Sales Co.
Los Angeles, C. P. Concrete Equip. Co.
San Francisco, Edward R. Bacon Co.
San Francisco, C. P. Concrete Equip. Co.
Boise, Idaho, Columbia Equip. Co.
Missoula, Mont., Mountain Tractor Co.
Kansas City, Mo., Contractors Machinery Co.
Albuquerque, N. M., Harry Cornelius Co.
Portland, Ore., Columbia Equip. Co.
Spokane, Wash., Columbia Equip. Co.
Mexico, Fourman Pacific Co., Los Angeles.

DREYER VIBRATOR CO., 509 East 16th Street Los Angeles, Calif.

LIGHTWEIGHT



1,000 Lbs. LESS DEAD WEIGHT!
"Weigh-in" a Smith-Mobile No. 3 Machine. Even with a FULL PAYLOAD, you'll find it is about 1,000 lbs. lighter than any other 3-yd. truck-mixer.

Carries a FULL PAYLOAD — yet Stays within Load Limits!

Why deliver only a partial payload in a heavy truck mixer when you can deliver a FULL payload in a heavy duty No. 3 Smith-Mobile without exceeding the maximum load limits specified by the majority of states?

Lightweight, streamlined design, with deadweight reduced to a minimum, this sturdy 3-yard truck mixer nevertheless maintains the well-known Smith rugged construction. Mounted on an economical 2-axle truck, and about 1,000 lbs. lighter than competitive 3-yard mixers, it easily stays within stringent load limits, *even when loaded to capacity.*

And the No. 3 has all other time-tested Smith-Mobile features — HIGH DISCHARGE . . . CONTROLLED DISCHARGE without segregation . . . VISIBLE MIXING . . . FEED CHUTE CHARGING . . . etc. Write today for a copy of Smith-Mobile Catalog No. 198-D.

The T. L. SMITH COMPANY
2857 North 32nd Street Milwaukee 10, Wisconsin, U. S. A.

No.3 SMITH-MOBILE

New River Levee

(Continued from preceding page)

a small sheet-metal work bench containing a vise, a Diehl bench grinder, and other assorted small tools. Alongside the bench is a 400-ampere Lincoln electric welder. In the stern of the dredge, just forward of the spuds, is another small maintenance area with bench, vise, grinding wheel, and an acetylene welding outfit.

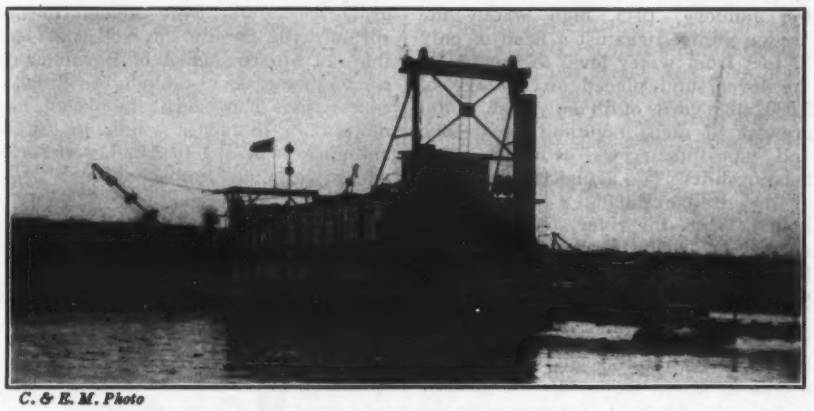
Floating and Land Lines

On the Morganza contract the dredge took material for the hydraulic fill from a river-bank borrow pit north of where the new levee begins and at a point from 600 to 800 feet beyond the existing levee. The 16-inch floating line from the dredge was supported on Hendry-designed pontoons, two to every 50-foot length of pipe. The pontoons are metal floats, 12 feet long x 4 feet wide x 3 feet high, with a saddle in the center of each pontoon on which the pipe is seated and tack-welded, eliminating the need of timber strongbacks to hold the floats together. A pontoon is placed about 10 feet from each end of the pipe, and connections are made with a 2-foot length of rubber sleeve. The dredge used an average of 350 feet of floating line.

The pipe carries a 20-inch-wide catwalk made from two 2 x 10's held to the pipe by 4 x 4-inch saddle blocks spaced 10 feet apart. The saddle blocks are held together on one side by a ½-inch-diameter bolt, 22 inches long, which passes through both the upper and lower 4 x 4; the other side is secured with a 2 x 4 used as a post for a 36-inch-high hand-rail, and also bolted to the upper and lower members of the saddle block.

The pontoon line was assembled with the help of the No. 12, a 40-foot tender with a beam of 18 feet, powered by a Cummins 240-hp diesel engine. Other floating equipment included a 40 x 20 x 5-foot steel barge storing 8,000 gallons of water; a similar barge containing a like amount of grade 3 fuel oil for the diesels; two other barges, 60 x 26 x 6 and 70 x 28 x 6, used for storing pipes, pontoons, pump parts, etc.

The land line had to be lifted from the river elevation to the top of the existing levee where the new construction started. At almost the beginning



C. & E. M. Photo

The diesel dredge No. 3, owned by the Hendry Corp. of Rattlesnake, Fla., with a 20-inch suction line, placed 1,500,000 cubic yards of hydraulic fill on a contract for 1.2 miles of new levee near Morganza, La.

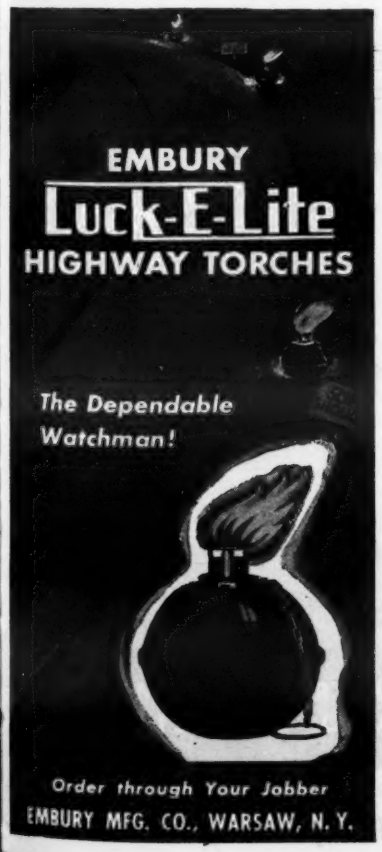
of the land line were the remnants of an old levee built in 1921-22, which had to be superseded within a decade by a second levee, which in turn is now replaced within almost a similar period of time by yet another levee, always moving away from the challenging waters. The 16-foot lengths of the 16-inch land line were run up to the crown of this old levee, and then carried on a timber trestle across the depression which was a borrow pit in the 1933 construction.

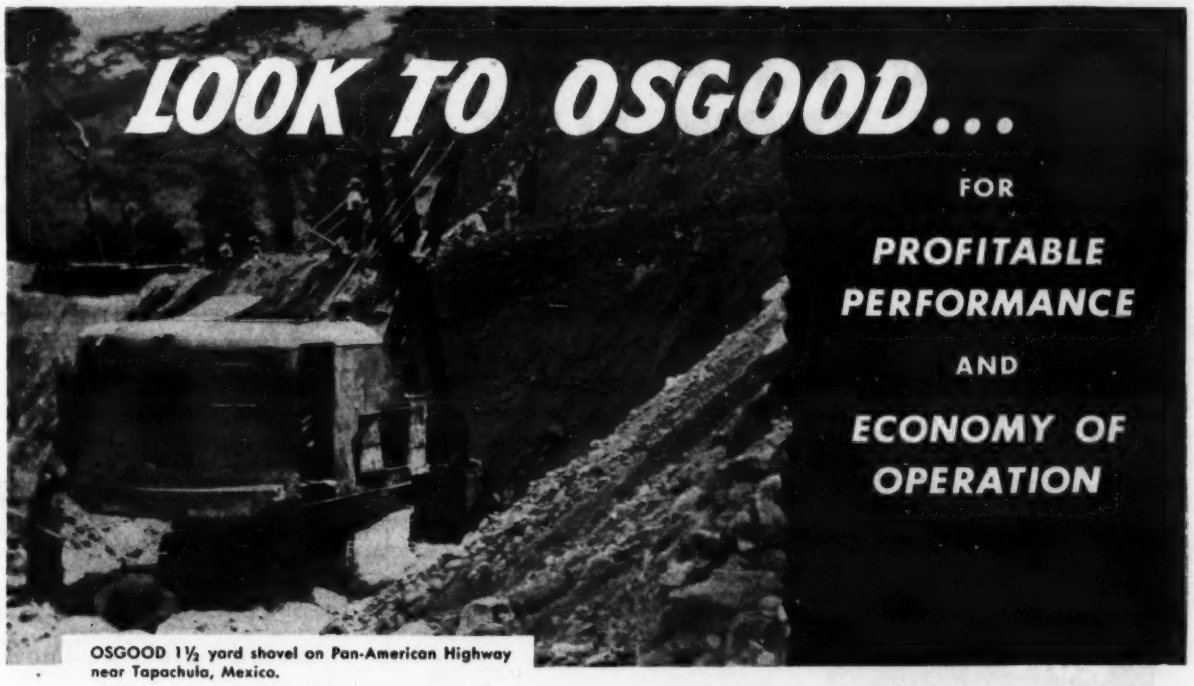
This 650-foot trestle was made of timber cut in the vicinity. The posts were 4 to 6 inches in diameter and at the deepest part of the pit were 19 feet high. A bent consisted of two of these posts, 5 feet apart, set in 18-inch holes dug by a post-hole auger. The bent was braced at ground level with a 2 x 4, and more 2 x 4's, or other larger lumber found available, were used for additional bracing at 4-foot intervals to the top of the bent. The bents were spaced the length of the pipe and were placed at the joints. They were further braced laterally with assorted pieces of lumber, and every other bent was strengthened by long poles resting on the ground and at the other end bearing against the pipe. The pipe was set in place on the trestle by a Bucyrus-Erie crane with a 45-foot boom.

Pumping the Fill

A shallow trench was dug in the top of the existing levee for the pipe-line crossing and backfilled with earth so

(Continued on next page)





OSGOOD 1½ yard shovel on Pan-American Highway near Tapachula, Mexico.

A COMPLETE LINE OF
POWER SHOVELS
CRANES
BACKHOES
DRAGLINES
PILE DRIVERS

Crawler and Pneumatic-Tire Mounted

Diesel, Gas, Electric

⅜ cu. yd. to 2½ cu. yds.

Construction, excavating and material handling jobs can be handled economically and profitably IF the equipment you use has been designed for dependable, low-cost performance. Before selecting your equipment, check into design, materials and construction—these are the factors that count!

These are the factors featured by OSGOOD during "100 years of service" . . . a century in which OSGOOD pioneered numerous advancements in design and construction that have become standard for the industry. *Look to OSGOOD* for such cost-cutting features as: better cab visibility, fewer wearing parts, greater accessibility of machinery, larger diameter power-operated frictions, greater "payloads" due to less counterweight and a host of other features that pay off in profits.

THE GENERAL EXCAVATOR COMPANY
CRANES, DRAGLINES AND SHOVELS
DIESEL, GAS, ELECTRIC

Associated with The General Excavator Company

OSGOOD
CRANES-SHOVELS MARION OHIO U.S.A. OSGOOD GENERAL
THE OSGOOD COMPANY • MARION, OHIO

OSGOOD
SHOVELS, DRAGLINES
CRANES

New River Levee

(*Continued from preceding page*)

traffic could pass over the line. On the new-levee side of this trench a Y-valve was put in the line and two pipes about 175 feet apart were run out. The valve was a simple arrangement consisting of a baffle plate that could be shifted back and forth to control the flow in either of the two outlets. Four men were necessary to open or close this valve since it could be moved only by hammering it on the side with a battering ram made from a 5-foot section of 16-inch pipe closed on one end and equipped on the side with handles made from some odd lengths of 1-inch pipe.

A crew of eight men added pipe as needed and regulated the valve. At the upper end of the project nearest to the dredge, nearly 1,400 feet of land line was used, and this distance increased as work progressed southward. During the January, 1945, high water, the dredge pumped against a head of only 37 feet from water level to the top of the levee, and placed an average of 3,000 cubic yards of fill daily with a total crew of 67 men, including the dredge and pipe-line crews, working three 8-hour shifts. The actual running time of the dredge during a day was 20 hours. When the river subsided to its normal level, the head against which the dredge had to pump increased to nearly 60 feet. The spring high water stages were not unwelcome to the contractor who benefited by the reduced head. As the fill proceeded to the south, a booster pump was added to the line to help the dredge. Pumping with the dredge did not begin until December 16, 1944, as the first two months of construction were given over to the building of the retaining dikes.

Dressing and Sodding

The levee slopes and berms were dressed by tractor and bulldozer units after the embankment was brought to gross grade and were sodded in the spring with freshly cut sod, not less than 16 square inches, of Bermuda or some other grass suitable to the climatic conditions. This sod was placed not more than 18 inches center to center and covered with 1 to 2 inches of earth which was then compacted.

Personnel

The building of this earth levee, which averaged more than 23,200 cubic yards of material per 100-foot station, was completed in August, 1945, at a total cost of $350,000. The New Orleans District, U. S. Engineer Department, at first set the project up as compacted-fill construction, but when the McWilliams Dredging Co. and Wilbanks & Pierce, Inc., both New Orleans dredging contractors, bid for the job on the basis

(*Concluded on next page, Col. 4*)

Complete Contracts Sooner with HOBART ARC WELDERS

...and with MORE PROFIT!

That's because Hobart delivers better welds faster. They're better since with a choice of 1000 combinations of amperage and voltage, you can get the EXACT welding heat for every job. And you get faster welding with Hobart's steady, dependable arc that deposits perfect beads. And then, with Hobart's Remote Control feature you can control the heat right at the work—a real time saver. The ideal welder for contractors—Hobart Gas Drive—is ready to go anyplace any time. Use coupon for details.

HOBART BROTHERS CO., BOX 16, TROY, OHIO

HOBART
One of World's Largest Builders of Arc Welders

Free! This handy "Welder's Vest Pocket Guide" will give you hundreds of welding hints. Check the coupon.

HOBART BROTHERS CO., BOX 16, TROY, OHIO

Please send me further information about the complete line of Hobart Arc Welders, and tell me how they can solve my welding problems.

☐ Send FREE copy of "Welder's Vest Pocket Guide"

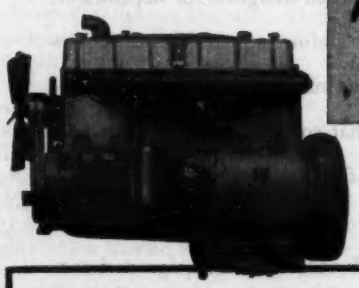
Name Position

Firm

Address

20 M.P.H. THE SNOW FLIES

...with WAUKESHA-POWERED Roto Wing



MODEL 145-GK six cylinders, 5¼ in. bore x 6 in. stroke, 779 cu. in. displ.

●

Overhead Valves with hard alloy valve seat inserts

Removable Wet Sleeve Cylinders

Gear Driven Oil and Water Pumps

Thermostat Controlled Cooling

Precision Bearings

Husky 7-Bearing Crankshaft

Waukesha Built-In Governor

●

SEND FOR BULLETIN 1186

● With its rapidly revolving 3-bladed rotor driven by a Waukesha Engine—the Roto Wing plow removes snow from air fields faster than it falls. Drifts 2 to 3 ft. deep vanish at the rate of 20 m.p.h. On highways, snow banks over 3 ft. deep are cut back 5 ft. beyond the road shoulder, at 10 to 20 m.p.h.

That's throwing snow! It takes sure speed and rugged power. And that super power plant—the Model 145-GK Waukesha Engine—has everything it takes *and more*. That means the utmost in power output, with unfailing dependability.

And, speaking of dependability . . . this snow plow is traveling on a Walters Truck powered with a Model 6-WAK Waukesha, *the* engine for super trucks and buses.

Waukesha Motor Co., Waukesha, Wis.
NEW YORK • TULSA • LOS ANGELES

WAUKESHA ENGINES

Pioneers

Since 1903, when Page introduced the first two-line dragline bucket and machine, we have constantly made improvements until today the Page Walking Dragline and *Automatic* Bucket are recognized as leaders in the industry.

PAGE ENGINEERING COMPANY
CHICAGO 38, ILLINOIS

★ ★ ★ Contribute to the January Victory Clothing Collection ★ ★ ★

This widening finisher is one of four new Blaw-Knox road-construction units.

Four New Machines For Road Building

Road builders will be interested in four new machines recently announced by the Blaw-Knox Div., Blaw-Knox Co., 2067 Farmers Bank Bldg., Pittsburgh, Pa. They are a widening finisher, a precision subgrader, a segregation eliminator, and a concrete paving conveyor.

The new finisher is intended primarily for widening work on concrete paving construction. Simple and inexpensive to operate, it is of the single-screed type, and can accommodate widths from 2 to 6 feet. The machine has two speeds, forward and reverse. There are two screed speeds to allow for concrete of different textures. The finisher can also be used for building concrete sidewalks.

An entirely new principle of cutting the subgrade to the exact elevation and shape for paving construction is employed in the B-K precision subgrader. The subgrade is left as firmly compacted as the original prepared grade, eliminating the need for subsequent rolling. The machine has flexibility of operation, and is adjustable for half or full-width paving operations.

Developed to prevent the tendency of coarse aggregates to segregate as they are discharged from overhead storage bins, the segregation eliminator is simple and inexpensive and can be installed in each compartment of the bin. Functioning automatically, it is adjustable in operation, so as to deliver a uniformly graded aggregate from the discharge gate.

The portable paving conveyor has been developed by Blaw-Knox to cope with the problem of delivering concrete from truck-mixers to the subgrade. The unit rides the forms ahead of the concrete spreader and finishing machine, and transfers the concrete from the truck-mixers to the paving area. A collecting hopper, cantilevered beyond the side form, receives the discharge from the truck-mixer while it is parallel to the longitudinal axis of the paving. The concrete is conveyed laterally and deposited in the center of the lane in half-width construction, and at the two quarter-points in full-width work.

Full details concerning this new equipment may be secured by writing direct to the manufacturer.

Schott Family Acquires Cleveland Pneumatic Cos.

Walter E. Schott of Cincinnati has been elected a director of the Cleveland Pneumatic Tool Co. and its wholly owned subsidiaries, Cleveland Pneumatic Aerol, Inc., of Euclid, Ohio, and Cleveland Pneumatic Tool Co. of Toronto, Canada. The action followed the acquisition by the Schott interests of the preferred stock and 97 per cent of the common stock of the Cleveland firm.

Harold C. Schott, brother of Walter, was elected Vice President and a director of the company. Also elected to the Board were Wendell A. Falsgraf, Harry C. Burns, and Coleman Harris. Present directors of Cleveland Pneumatic remaining on the Board are George P. Torrence, President, John S. Clark, Vice President and Treasurer, John F. Wallace, Chief Executive Engineer, and E. W. (Pop) Cleveland, Special Representative.

Costa Rica Public Works

A bond issue recently approved by the Costa Rican Congress has resulted in the planning of public-works projects for the municipalities of Limon, Puntarenas, and other locations. Sanitary facilities, streets, and the construction of a breakwater are outlined for Puntarenas, with an allotment of $1,575,000. Limon is to get a like amount for the improvement of the water-supply system and roads. The construction of a road to connect Las Juntas with the Inter-American Highway, and another to join Tiloran and Canas, will cost $1,150,000.

New River Levee

(*Continued from preceding page*)

of hydraulic fill, the bids were readvertised, permitting the contractor to use any type of fill he desired. The scarcity of material suitable for levee construction was the reason for the option permitted. The readvertised contract for this 6,400-foot section of new levee requiring 1,500,000 yards of hydraulic fill was awarded to the Hendry Corp. of Rattlesnake, Fla.

The work was done under the direction of the New Orleans District, U. S. Engineer Department, of which Colonel George H. Hudson, Corps of Engineers, is District Engineer, and Major A. H. McRae is Executive Officer. Walter C. Carey is Chief of the Inspection Division of the District. John M. Busby was Resident Inspector for the U. S. Engineers. For the Hendry Corp., Captain Carl Carter is Master of the No. 3 dredge, with I. W. Haile, Superintendent, and G. G. Frissell, Assistant Superintendent on this project.

★ $1,000,000,000
construction program
now getting under way
. . . ARE YOU READY
WITH REAL PROFIT EARNING EQUIPMENT
to successfully compete for
your share of this business?
You'll need fast, rugged, economical-to-operate machines — like up-to-the-minute MICHIGAN Mobile SHOVELS-CRANES. They can be relied upon to stay on the job day after day with a minimum of maintenance or repair — they've proven it on scores of tough civilian and military jobs the world over . . .
IT WILL PAY YOU TO INVESTIGATE these profit-earning advantages of MICHIGAN Mobile SHOVELS-CRANES — write today for data and specifications in Bulletin CE-16.
★ WPB estimate for 1946
⅜ yard and ½ yard Shovels — convertible to crane, clamshell, dragline, trench-hoe.
6, 10 and 12 ton
CRANES
FINGER TIP AIR CONTROLS
MICHIGAN
POWER SHOVEL COMPANY
BENTON HARBOR, MICHIGAN

The Pressure-Lube is a new portable greasing outfit designed to provide on-the-spot lubrication for all types of heavy equipment.

New Lubrication Unit Versatile, Portable

Eliminating the necessity for hand greasing operations, a new development in lubrication is said to meet effectively any requirement while simplifying the grease job and reducing maintenance costs. Known as the Pressure-Lube, the unit is capable of delivering up to 12,000-pound steady pressure, instantly available to clear the most obstinate channel stoppages and effect complete lubrication of parts, its manufacturer states.

The Pressure-Lube can be supplied with a grease gun for every purpose and is available either with battery power or gasoline motor. Built compactly, it has a simple design, with a minimum of moving parts. Providing on-the-spot lubrication, the equipment is said to speed up servicing machines on the job.

Full details may be obtained from Pressurelube, Inc., 609 W. 134th St., New York 31, N. Y. Just mention this item.

Construction Market Enlarged by RFC Loans

An increase in the number of local government construction projects is foreshadowed by the announcement that the Reconstruction Finance Corp. loans, either singly or with bankers jointly, are now immediately available, as before the war, to meet up to 100 per cent of the cost of such work. To aid such lesser governmental units as cities, towns, villages, as well as states and counties, in building needed public works and as a means of assimilating the unemployed during reconversion, the loans may be used for the construction or improvement of water supply and distribution systems, sewage-treatment plants, airports, bridges, tunnels, highways, stadiums, docks, buildings, etc. School and park districts, public corporations, authorities, boards, and commissions may also borrow RFC funds for such projects.

Circular 22, available from local RFC offices, gives details of the loan plan.

LaPlant-Choate Founder, Bulldozer Builder, Dies

E. W. LaPlant, founder of the LaPlant-Choate Co., died in his 73rd year on December 4, at his home in Cedar Rapids, Iowa.

Mr. LaPlant, a native Iowan, entered business at 25 as a house mover, using crude horse-drawn rollers. He retired in 1944 as director of one of the world's largest manufacturers of heavy construction machinery, a corporation valued at almost $15,000,000.

In 1921 Mr. LaPlant took his nephew, R. E. Choate, into his business, marking the beginning of the organization which Mr. Choate has served as President since 1927. The firm originated the bulldozer in 1924, and supplied over 30,000 of them to our armed forces in the recent war.

Pump Dealers in West

The appointment of two distributors of its pumping equipment in the Northwest has been announced by Fairbanks, Morse & Co., Chicago, Ill., through its Seattle office. The new outlets are the Milwaukee Machinery Co., Portland, Ore., and the Cascade Machinery Co., Seattle, Wash.

W. H. Perry, formerly with the F-M branch in Dallas and more recently with the Westco Pump Sales Co. in California, is head of the pump department for Milwaukee Machinery Co. This firm will handle F-M and Pomona turbine pumps, Niagara propeller, Mixflow, and Westco horizontal turbine pumps.

Cascade Machinery Co. will carry all Fairbanks-Morse pumps, including the Pomona and Westco models, and will also serve as distributor for F-M motors and electrical equipment. Clyde A. Retter, Manager of Cascade's pump department, was formerly with the Seattle office of Fairbanks-Morse. He had been District Manager for the Pomona Pump Co. before that organization was purchased by Fairbanks-Morse.

Heil Adds to KC Staff

The appointment of Chester Park and Vernon "Casey" Jones as sales representatives with its Kansas City staff has been announced by the Heil Co., Milwaukee. Previously with the Ann Arbor-Klughartt Sales Co., Mr. Park will handle Heil road machinery. Mr. Jones, formerly stationed at the Heil branches in Washington and Philadelphia, will devote his attention to the firm's line of truck bodies and hoists and transportation tanks. The Kansas City offices are located in the Board of Trade Bldg., Kansas City 6, Mo.

DON'T THROW AWAY BROKEN PARTS—

Repair-Weld Cast Iron with

P&H "HARCAST"

You can make immediate repairs — save time — save money — keep equipment on the job longer with welding. No matter what the metal, there's a P&H electrode to weld it properly.

For example P&H HARCAST welds cast iron to cast iron as well as cast iron to steel. If you haven't used this new electrode for weld-repairing your broken cast iron parts — write us today for a trial sample.

In fact, we can help you no matter what your weld repairing problems might be. Ask about the complete line of electrodes for hard facing against impact and abrasion.

Don't Delay — See your P&H representative or write for full information!

General Offices; 4419 W. National Ave., Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

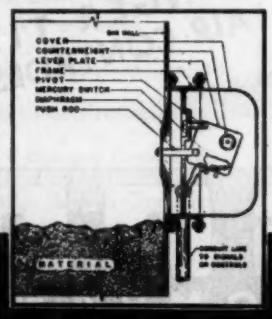
WELDING ELECTRODES • MOTORS • HOISTS • ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

STOP Guessing ABOUT BIN LEVELS.

BIN-DICATOR

WRITE TODAY for literature. If you wish, mention your specific problem and get specific installation data.

Below: Construction diagram. Bin-Dicator is simple, rugged, needs no oiling or adjustment.



Prevents Overflow.
Insures Full Supply at SMALL COST!

Accurate control of storage and flow for practically any materials — granular, powdered, semi-liquid, liquid, etc. Experience in thousands of installations in over 130 industries proves the Bin-Dicator quickly saves many times its small cost by preventing supply-delay and spillage. Easily mounted under ANY bin conditions.

FULLY GUARANTEED!

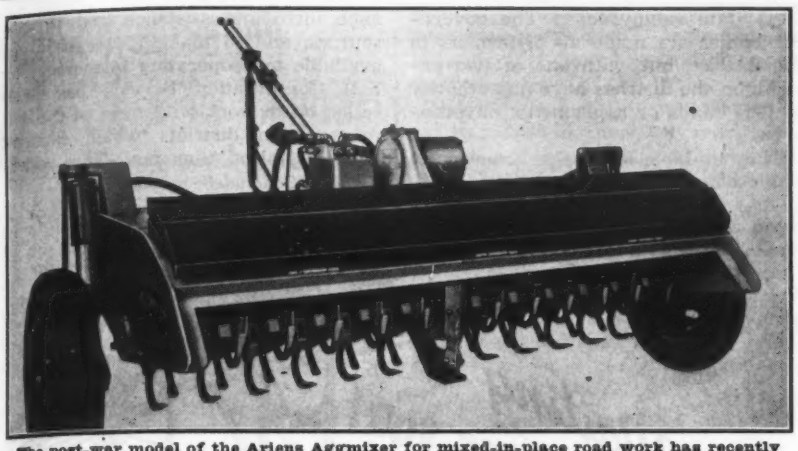
BIN-DICATOR COMPANY
14617 Jefferson • Detroit

The Eyes of the Bin

MECHANICS
Roller Bearing
UNIVERSAL
JOINTS
Lifetime Lubrication
Avoids Costly D
On jobs where there is a race against time, your machines will operate more reliably, and with less time lost for servicing, if they have the "lifetime" or once-a-season lubrication features of MECHANICS Roller Bearing UNIVERSAL JOINTS. Let our engineers show you how this and other advantages of MECHANICS Roller Bearing UNIVERSAL JOINTS will benefit your new or improved models.

Mechanics Universal Joint Division
BORG-WARNER CORPORATION 2026 Harrison Avenue Rockford, Illinois

MECHANICS Roller Bearing UNIVERSAL JOINTS ARE SERVING IN



The post-war model of the Ariens Aggmixer for mixed-in-place road work has recently been announced.

Speedy Machine Does Mixed-in-Place Work

Secondary-road work requires equipment designed and built especially for mixed-in-place construction, the Ariens Co., Brillion, Wis., says in announcing the post-war model of its Aggmixer. The Ariens Aggmixer is designed for jobs where aggregates and binder are used in the construction of highways, streets, airports, cantonments, etc. The machine pulverizes, mixes, and aerates almost all types of aggregates with such binders as bituminous materials, cements, clays, chlorides, etc.

Easy to operate, the Aggmixer is adaptable to any tractor, and has hydraulic adjustments for depth. It is made in four sizes, with normal cutting widths of 4, 5, 6, and 7 feet. The tines operate with a swirling, chopping action which picks up, pulverizes, and mixes either wet or dry materials on the road surface.

Further details of the Aggmixer may be obtained by interested contractors and state and county engineers direct from the manufacturer. Just mention this item.

Literature on Making Rubber Belts Endless

Making rubber belts endless through the utilization of the Plylock belt joint is the subject of a new B. F. Goodrich Co. bulletin. The method is illustrated and described step by step, and seven advantages of the joint are listed in the 4-page folder.

In the Plylock method, the ends of the plies are interlocked and sunk beneath the surface of the belt by the removal of a short section of the fabric in the second ply. The resulting depression is filled with a reinforced rubber cushion, and the joint vulcanized. Belt thicknesses are said to remain uniform throughout, and the ply ends to remain locked in position and protected from wear, deterioration, and windage.

Copies of the bulletin, Catalog Section 2155, may be obtained by readers who write to the B. F. Goodrich Co., Akron 18, Ohio, and mention this review.

AC Arc Welding Catalog

A new 200-amp Bumblebee is among those described in an illustrated 16-page catalog of Wilson ac arc welding machines. The new equipment is designed to meet the demands for a small arc welder comparable in performance to the larger Bumblebees, the catalog says.

Also described and illustrated are the 300 and 500-amp Standard and All-Weather models. Small transformer-type ac welders, running gear, remote control, and the Airco line of shielded-arc electrodes are shown. Charts give the specifications and electrical characteristics of the Bumblebees.

Readers of CONTRACTORS AND ENGINEERS MONTHLY may obtain copies of this booklet on Wilson Bumblebee arc welders by writing to Air Reduction, 60 E. 42nd St., New York 17, N. Y. Mention this notice, and ask for Form ADW-53A.

Electric Power Plant Mounted on Spreader

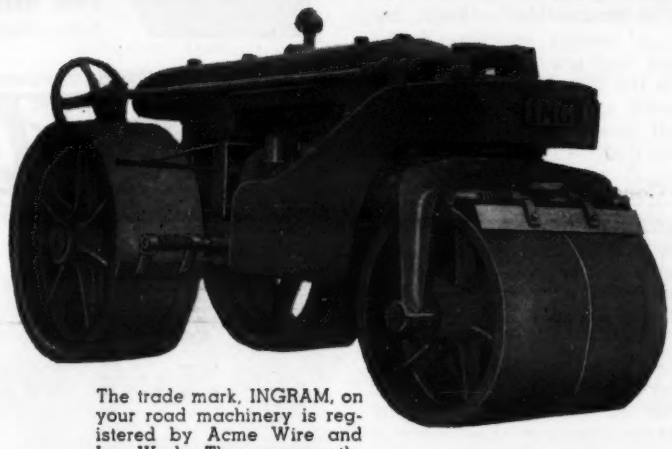
Thompson Construction Co., concrete-paving contractor of Joliet, Ill., recently purchased a Blaw-Knox concrete-paving spreader for use on its extensive highway contracts. Operated by gas power, the machine runs on the steel road forms and spreads the concrete batches uniformly over the prepared subgrade at any desired elevation. It is equipped with vibrators for vibrating the concrete along each edge, at the center longitudinal joint and at transverse joints to eliminate honeycomb.

A Model W3S power unit, made by D. W. Onan & Sons, 1249 Royalston Ave., Minneapolis 5, Minn., was mounted on a cross member of the heavy steel frame of the spreader to furnish electric power for the ½-hp motors driving the four vibrators mounted on the spreader, as well as for emergency floodlights, hand drills, and saws. The Onan unit is a 3,000-watt plant with 12-volt push-button starting, and generates 115-volt, 60-cycle, single-phase alternating current. The prime mover is an Onan W2C 2-cylinder water-cooled gasoline engine of 6.5 hp, and is directly connected to the generator to insure permanent accurate alignment.

Aqueduct in Venezuela

A contract for the construction of an aqueduct to supply La Guaira, Venezuela, and Maiquetia, a nearby town, was awarded recently, *Foreign Commerce Weekly* reports. When completed, the service, integrated with existing water-supply facilities, will require the construction of two additional distribution reservoirs, one in each municipality. The project will cost $1,691,907, and is scheduled for completion in October, 1946.

CUT COSTS WITH THIS NEW INGRAM ROLLER



The trade mark, INGRAM, on your road machinery is registered by Acme Wire and Iron Works. There are no other INGRAM rollers made

★ 4-TON WEIGHT
★★ HIGH SPEED
★★★ LOW PRICE

Here is a new light weight INGRAM ROLLER! And it's made to the same high quality specifications Acme has always built into INGRAM ROLLERS! That's why this new INGRAM ROLLER meets the need for a low-priced, dependable 3-wheel roller. You now can choose your INGRAM ROLLER from three sizes — up to 10 tons. Manufactured and guaranteed by Acme Wire and Iron Works. Sold by dealers everywhere! Place your order now.

ACME WIRE AND IRON WORKS
1343 W. LAUREL STREET SAN ANTONIO, TEXAS

McCAFFREY TRACTOR SHOVEL

These Features Make It Your Best Choice—

100% CABLE CONTROL OF BUCKET
Permits gradual dumping of the load.

★

WEIGHT CENTERED ON TRACTOR FRAME—

★

BUCKET CAN REACH OVER CENTER OF TRUCK BEING LOADED—

★

RIPPER CARRIED ON MACHINE READY FOR IMMEDIATE ACTION—

★

LOW OVER-ALL HEIGHT FOR TRANSPORTING—

WITH RUD-O-MATIC CONTROL

DIGS • GRADES • RIPS • LOADS

M. P. McCAFFREY, INC.
2121 East 25th Street • Los Angeles 11, California
Kimball 7181

Soil Conservation Work by Contract

(*Continued from page 6*)

of leveling and other preparation of land for irrigation, as well as from 5,000,000 to 6,000,000 miles of terraces and 1,200,000 farm ponds and wells. This, of course, is not work that the Government will do at its own expense within the next few years. The time required will depend upon farmers' interest in and financial ability to carry out such work, as well as upon the national interest in soil conservation, reflected by public financial support.

By comparing the amount of work accomplished in one year with the total needed, it is seen that it will take years to build the required farm ponds, complete the necessary terraces, and so on. One of the factors influencing the rate of progress is the need for equipment and other services which the contractor can help to supply.

Type of Equipment Needed

It is understood that the contractor familiar with conservation work will have his own ideas about the proper type of equipment to be used. The equipment may be light or heavy, as economic consideration and personal preference indicate, but there is a relatively large amount of moving from farm to farm that requires mobile equipment. As an example, terraces may be constructed efficiently with farm tractors and disks, plows, or small blades. Some contractors prefer heavy crawler tractors and blade graders and some use road patrols for terracing. For building earth dams and ditches, the conventional types of grading and excavating equipment normally are used.

In our experience, one of the most difficult problems to solve in installing conservation methods is obtaining proper equipment. The soil conservation districts recognize this problem, and many of them have procured machines for rental to cooperating farmers. It is believed that some district-owned and operated equipment is desirable for demonstrating new practices to farmers, for proving the value of new practices, and for constructing scattered jobs. Experience indicates that one or two years' operation with district equipment is often necessary before a work load is developed that is attractive to contractors. Most districts have not been able to provide all the equipment needed, and there now is legislation before Congress proposing to make surplus military equipment available to districts. Such action, it is believed, would serve to increase the demand for conservation work, through demonstrations, and consequently expand the opportunities for contractors in this field.

There are three general sources of equipment for district farmers. First is their own farm equipment, such as tractor-operated disks, plows, and blades which are adaptable for terracing and opening shallow ditches. Some farmers prefer to use their own equipment, while others are not equipped properly or prefer to have the work done for them. Ordinary farm machines seldom are adequate for constructing farm ponds, leveling land, and opening larger ditches. Second, district equipment may be available at a rental figure based on an hourly or unit price rate. Third, a contractor may be employed to do a complete job. Where sufficient interest has developed to attract contractors to the location, all three methods may be in operation at the same time. At the beginning of district operation, there is seldom sufficient demand for work to be of interest to contractors, and the first two methods may operate for some time before it is practicable to begin the third. In all events, everyone favors the method that provides the greatest benefits to the farmers—that is, good-quality work at reasonable cost, and needed soil conservation on the land at the earliest date.

Soil Conservation Agencies

The contractor in the soil conservation field soon will come in contact with soil conservation districts and, through them, with representatives of the U. S. Department of Agriculture's Soil Conservation Service and other pertinent agencies, state extension services, and other assisting groups. He should understand the functions of each of these agencies, because they have an assigned responsibility for planning and supervising soil and water conservation work.

In order to provide farmers with a method for organized action in solving their soil and water problems, forty-five of the states have enacted soil conservation district laws. The districts are legal state subdivisions. The governing bodies are made up of farmers in the district, but, with one or two exceptions, the districts have no authority to levy taxes or assessments on property.

They do have authority, however, to request Federal, state, and local assistance, including assistance from private sources, and to make these resources available to cooperating farmers. The Soil Conservation Service has been called on to work with most of the soil conservation districts which farmers have organized thus far. This assist-

(*Concluded on next page*)

"I realize those husky Sterling Wheelbarrows are not available today for immediate shipment — but they are certainly worth waiting for."

Men naturally prefer Sterlings because of their well-balanced construction and easy wheeling qualities. Sterlings speed up the material-transport job . . . make it possible to haul many additional loads each day. Right now, the demand for Sterlings greatly exceeds the supply. However, deliveries of tubular framed barrows are being stepped up as rapidly as conditions permit.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling S WHEELBARROWS

CLEVELANDS
Have What It Takes . . .

. . . For Dependable Economic Trenching Performance

STAMINA . . .
SPEED . . .
VERSATILITY . . .
POWER . . .
BALANCE . . .
COMPACTNESS . . .

Quality-Built, For Top Performance In Any Type of Soil or Terrain

THE CLEVELAND TRENCHER COMPANY
20100 ST. CLAIR AVE. • CLEVELAND 17, OHIO
"CLEVELANDS" Save More . . . Because They Do More

FULL HP TEST RUN
Double-Checks
Power Output of All
WISCONSIN Air-Cooled Engines

Every 4-cylinder V-type Wisconsin Engine, as well as all single cylinder engines from the smallest to the largest, are put on a 4-hour test run (the last hour under full load), working against a specially designed water brake.

This not only serves as an operating check on power output, but also provides a valuable *functional pre-test* of every working part . . . because no engine is any better than its smallest individual part, nor all of the parts working together in perfect mechanical coordination.

All this is important in relation to the work these engines may be called upon to do when *powering your equipment.*

Most H.P. per pound
WISCONSIN MOTOR Corporation
MILWAUKEE 14, WISCONSIN, U. S. A.
World's Largest Builders of Heavy-Duty Air-Cooled Engines

Soil Conservation Work by Contract

(Continued from preceding page)

ance consists primarily of technicians who plan and supervise the installation of conservation practices, plus a small amount of equipment furnished to the districts for use by farmers on a rental basis, and also certain seed or tree-planting materials. Engineers and technicians provide much of the engineering and other services for structures and facilities which contractors construct in those districts.

Farmers in soil conservation districts who receive technical assistance through the Soil Conservation Service also may receive limited payment for installing terraces, farm ponds, drainage, et cetera, through the AAA program.

The organization of soil conservation districts has proceeded rapidly during the war years, reflecting the farmers' desire to do something about their conservation problems. Wartime restrictions on equipment and labor prevented many of them from carrying out these objectives fully, and there is now a large volume of farm conservation work planned and ready to be installed when equipment and labor are available.

Contractors' Responsibility

Contractors in this field operate with less engineering assistance than they may have been accustomed to receive in other lines of work. Consequently, they have a greater moral responsibility to turn out good work under all conditions. The engineers engaged in assisting soil conservation districts prepare complete plans and specifications for the larger soil conservation jobs, such as drainage and irrigation systems, and structures, and usually they are available for supervision of construction. However, on the more extensive practices, such as terracing, specifications usually are prepared for a state or other large area, and adjustments are made in individual cases to meet local farmer requirements.

Trained technicians also generally are available to plan the required system of outlets and stake out the terraces, but may not be available to check the completed work. For this work, and in localities where adequate technical help is not available, the contractor often must exercise his own judgement as to the correctness and adequacy of the work he is doing. Otherwise, he might terrace fields that should not be terraced, construct terraces to inadequate specifications, or fail to take into account the existing water-disposal problems. Considerable money thus would be wasted for the farmers, and the structures installed actually might increase the erosion hazard. Consequently contractors who are not trained conservationists should insist on adequate technical assistance for their operations. Terraces, for example, are simple structures and easy enough to build, but the proper planning and location of terraces on the ground requires a knowledge of soils, land use, farming practices, and hydraulics—all combined into a workable system to control erosion, conserve moisture, and not interfere with farming operations.

Opportunity for Contractors

My advice to prospective contractors in the soil conservation field is to select a work location in a soil conservation district where sufficient demonstration has been made to assure a good work load among interested farmers. It will be found that these farmers already have decided to install conservation practices and that the work has been planned. Become acquainted with the district governing body and local agricultural workers and assure them of your interest in conservation by performing good work in accordance with their program.

Select adaptable equipment which can be moved inexpensively from job to job. Learn about conservation needs and about the functions and limitations of the structures you propose to build. Finally, do good work at a fair price. If these conditions are observed, there is room for more contractors in the conservation field now. We expect a much greater expansion of the program throughout the next few years. It is going to take plenty of work out on the land.

Multi-Utility Crane For Four Services

A new mobile crane unit, which incorporates power shovel, trench hoe, dragline, and clamshell, has been put into production by the American Steel Dredge Co., Fort Wayne, Ind. Designed by John D. Rauch; the equipment has been undergoing severe field tests for two years.

Featuring independent or simultaneous operation of boom, shovel or trench hoe, or propulsion mechanism, the unit can travel, boom, swing, and hoist at the same time. It has a full-vision cab, and a self-leveling chassis which permits operation on uneven ground.

Complying with all highway-travel regulations, the rubber-tire-mounted crane has a 62-hp gasoline engine which drives all four wheels and the hoist mechanism. Maneuverability is provided by a 7-foot 8-inch wheelbase. Four travel speeds range up to 15 mph. The hoist drums are oversize to reduce cable wear. There is no center pin, the cab revolving on a 48-inch ball-race outside the swing gear. All machinery gears are enclosed and oil-immersed.

To be sold under the name of Wayne crane, the equipment will be available as a crane only or with the accessory groups for use as a power shovel, trench hoe, clamshell, or dragline. A complete unit with shovel, trench hoe, clamshell, or dragline weighs about 25,000 pounds. The crane, clam, or dragline has a 30-foot boom; the shovel and trench hoe, a 15-foot boom. The shovel, dragline, and clamshell have ½-cubic-yard capacity; the crane can handle 4 tons at a 10-foot radius.

Full details on the Wayne crane may be secured direct from the company.

Michigan Welding Outlet

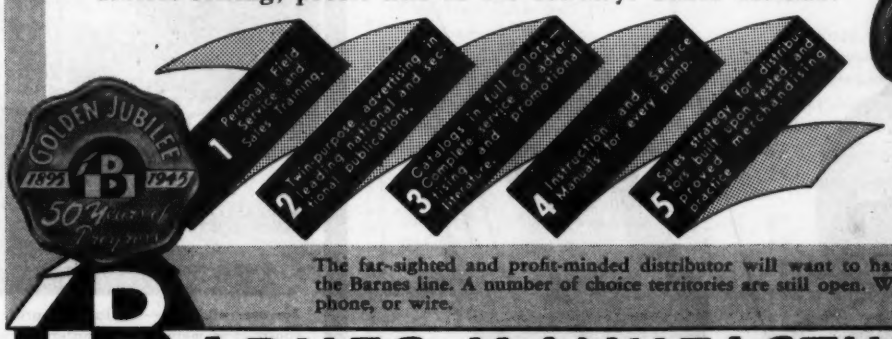
A welding supply house for western Michigan has been established at 215 Oakes St., S. W., Grand Rapids, by R. Dudley Layman, for 19 years associated with the Lincoln Electric Co., Cleveland, Ohio, manufacturer of arc welders.

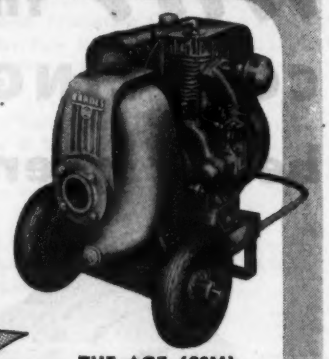
Mr. Layman has been succeeded as District Manager and Welding Engineer at the Lincoln office in Grand Rapids by I. R. Bartter, formerly Manager of the Duluth branch.

BARNES OFFERS DOUBLE-BARRELED PROFIT POSSIBILITIES FOR PUMP DISTRIBUTORS

Barnes is out in front again. First, Barnes announced a newly designed line of automatic centrifugal pumps with stepped-up capacities which are now displayed by Barnes distributors.

Barnes offers an array of hard-hitting selling helps that go side by side with Barnes better pumps to make this line the fastest selling, profit line in the country. These include:


GOLDEN JUBILEE
1895 1945
50 Years of Progress
1 Personal Field Service and Sales Training.
2 Twin-purpose advertising in leading national and sectional publications.
3 Catalogs in full colors. Complete service of advertising and promotional literature.
4 Instruction and Service Manuals for every pump.
5 Sales strategy for distributors, built upon tested and proved merchandising practice



THE ACE (20M)
Complete line with capacities from 3000 GPH to 90,000 GPH.

The far-sighted and profit-minded distributor will want to handle the Barnes line. A number of choice territories are still open. Write, phone, or wire.

BARNES MANUFACTURING CO.
Quality Pump Manufacturers for 50 Years
MANSFIELD, OHIO

Announcing PREFORMED
Bāseal
© 1945

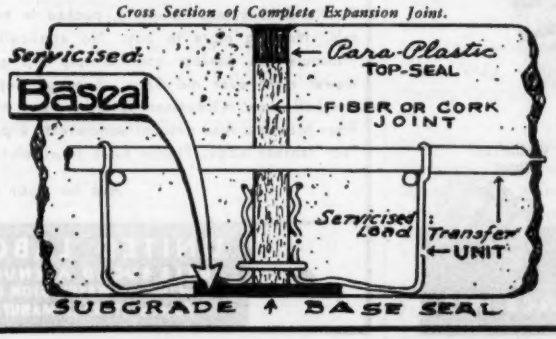
A SUBGRADE WATERSTOP!

Baseal is the latest contribution by Servicised to the Road Building Industry, a base-sealing strip as the name implies—new in purpose, performance, and design. A preformed, flexible, adhesive strip in a roll. Stops infiltration at the Danger Point at bottom of every Lateral Expansion Joint.

SELF BONDING

Baseal has this outstanding quality that after the wet concrete is poured on, sets up and becomes dry, a permanent bond is formed with the Baseal, which results in a perfect watertight joint between the two adjoining slabs and the base strip.

Cross Section of Complete Expansion Joint.



TIME AND LABOR SAVED

Baseal is a pliable adhesive strip of one quarter inch thickness, and of width (usually 3 to 8 inches) and lengths to conform to width of paving slab. A very important feature of Baseal is its high degree of cohesive, adhesive, resilient and permanent plastic properties. It is easily handled, and installed. Supplied in convenient roll form, each strip is treated to prevent pieces from sticking together in shipment or storage.

Send for Details and Specifications.

SERVICISED PRODUCTS CORP.
6051 West 65th Street, CHICAGO 38, ILL.

Cable, Pipe Locator Tells Depth As Well

The problem of locating underground pipe or cable on excavation jobs has been alleviated by a newly developed improvement in the Stewart Cable Tester. This tester is now built with a device to indicate the depth of the subsurface material as well as its location.

The portable detector is especially useful for checking the depth of cable at river crossings, for determining whether or not a service pipe is below the frost line in lowering or regrading a thoroughfare, or in revealing the location of pipes or cables that have been lost or forgotten.

Simply operated, the unit is said to maintain absolute accuracy in its search through the inclusion of a detector coil, a neutral exploring coil, and a level-in coil. It has head phones and a lamp circuit for checking all connections after the test has been set up. Ruggedly built and completely encased for all-weather use, the unit weighs about 22 pounds, and is 12½ x 7¼ x 11 inches.

Full details on the Stewart Cable Tester-Locator may be secured from W. C. Dillon & Co., 5410 West Harrison St., Chicago 44, Ill.

Heavy equipment can be readily moved about a shop or garage by means of an Elwell-Parker two-wheel dolly and low-lift platform truck.

Dolly Set-Up Moves Long, Heavy Objects

The moving of long, heavy objects in the shops of contractors or highway departments may be facilitated by using a two-wheel dolly and a low-lift platform truck, as shown in the accompanying illustration. The load is lifted onto the dolly by overhead crane. The dolly, made of steel plate, has its forward end mounted on two wheels, while the rear end rests on the floor. Its upper surface is practically at uniform level, at a height making it easy for the truck's platform to be pushed beneath it. By lifting the rear end of the dolly off the floor, the load is supported on six wheels, four on the truck and two on the dolly.

Further details on this Elwell-Parker dolly may be obtained by writing to the Elwell-Parker Electric Co., 4000 St. Clair Ave., Cleveland, Ohio, and mentioning this news item.

WHY the HYDRAULIC COUPLING gives you a better operating shovel...

A number of nationally known power shovel manufacturers have adopted the Twin Disc Hydraulic Coupling as standard original equipment.

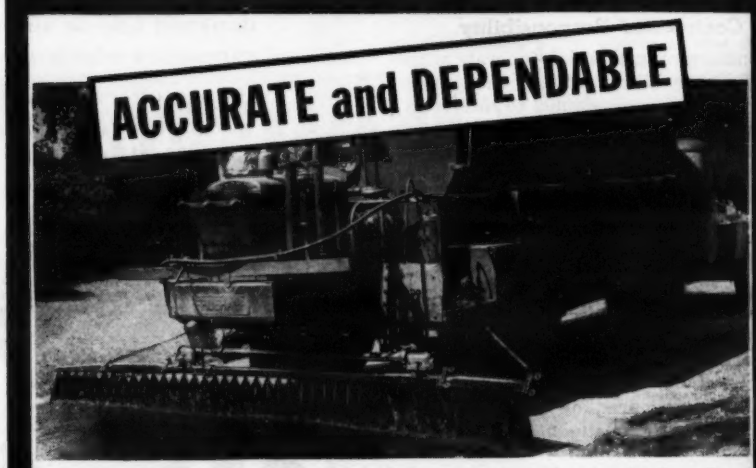
Performance records show that the hydraulic coupling gives both better and easier operation, as well as longer wear-life, due primarily to the "fluid cushion" which not only prevents destructive shock loads from being transferred to the driving mechanism, but also smooths out the cyclic variations of the engine. You owe it to yourself to know the the whole story. That's why we invite you to send for the new "Hydraulics Issue" of *Production Road*. Its pages will give you a fund of authentic data and reports on a wide variety of industrial applications of hydraulic drives. Write the TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

ETNYRE

"Black-Topper"

BITUMINOUS DISTRIBUTORS



For over 40 years—constant research, faithful attention to engineering detail, quality construction methods and materials—all assure you of efficient, economical operation with Etnyre "Black-Topper". Get details—see your Etnyre dealer or write us.

E. D. ETNYRE & CO., Oregon, Illinois

with **PLASTIC ROCK!**

Trowel a smooth, tough, plastic surfacing right over your old concrete or wood floor.

Plastic Rock comes complete, packed in barrels. Nothing more to buy. No application "formula" to confuse you. Simply mix and trowel right over old floor. Average depth one-half inch. Old floor Saturday is a new floor Monday. Also patches concrete to a perfect feather edge. Plastic Rock is absolutely spark-proof, skid-safe wet or dry, dustless, silent. Feels like cork under foot. Cannot splinter, crack, crumble, curl or loosen. Heavy loads on steel wheels actually improve it. Five-year-old floors show no wear. Natural color is dark gray. Used by U. S. Army, Navy and largest industries in America. Your contractor or your own crew can apply. Write now for complete information.

Ask for your copy of Report 220-C

UNITED LABORATORIES, INC.
16815 EUCLID AVENUE · CLEVELAND 12, OHIO
Export Division: WASHINGTON INTERNATIONAL SALES, Washington, D.C.
In Canada: STORRAR MANUFACTURING COMPANY, Weston, Ontario

Economies in Forms For Concrete Jobs

Tubular metal adjustable tee-posts that are reported to save up to 40 per cent of time and lumber in assembling wall and floor forms, and numerous combinations of trusses for supporting the forms, will be available from Ray J. Moths Co., Inc., 714 W. Wisconsin Ave., Milwaukee 3, Wis.

The RJM tee-posts consist of a head 4 feet in width and 5 feet in length, properly braced. To the head is attached a 2 x 4 held in place by clips. The exterior shaft of the head has two ¾-inch holes, spaced 6 inches apart to receive ¾-inch pins for making the extension. The interior shaft of these posts is of variable length and has a screw jack built into the base, with holes spaced 12 inches on centers for the length of the shaft. When the head and interior shafts are assembled, various lengths are easily adjusted from 6 feet 6 inches up to 20 feet or more by using variable lengths of interior shafts. The trusses are available in three sizes, 2, 5, and 8-foot sections, so that numerous combinations of lengths can be made up, ranging from 4 to 18 feet.

In setting up the forms for wall construction, a steel bar either ¾ or 1 inch round is bent into a U shape and placed in the concrete footing, with the two legs of the bent bar projecting from the footing. These U bars are lined up accurately to receive the RJM trusses. One facing of the trusses is erected by placing it over the bar which projects from the footing. A 2 x 6-inch board is used as an aligner and fastened by a system of clamps to the upper edge of the truss for alignment. The wall forms are then supported and braced with tee-posts. The next step is to apply the plywood panels to the facing. The second facing of the forms is then erected in the same manner.

Full information regarding RJM concrete-form products may be secured by writing direct to the manufacturer.

★ MallDrills put extra torque into drill bits that speeds heavy construction, drilling of metal, plastics and wood.

★ Light-weight — compact design and perfect balance add to the adaptability of MallDrills. Also reduce worker's fatigue.

★ Special steel alloy gears and self-lubricating bearings assure increased speed, cool operation and long service. Easily serviced—commutator can be inspected and brushes replaced without dismantling drill. Ruggedly constructed for long, hard usage.

★ Both ¼" and ½" models operate on 110-volt A.C. or D.C. or 220-volt A.C. or D.C. ¼" drill is available in two speeds.

Ask your Supplier or write for catalog on MallDrills, MallSaws, Electric Mall Planes, Mall Chain Saws, and Mall Concrete Vibrators.

MALL TOOL COMPANY
7743 South Chicago Ave., CHICAGO 19, ILL.
*25 Years of "Better Tools for Better Work."

You'll wonder how you got along without this unique

DATA BOOK FOR CIVIL ENGINEERS —DESIGN

By ELWYN E. SEELYE, Consulting Engineer

(1945)
417 Pages
$7.50

Nowhere else in one volume today will you find all the data that are concentrated in this book. Over 400 pages of plates cover the main fields of civil engineering—structures, sanitation, water supply, drainage, roads, airfields, dams, docks, bridges and soils.

DATA BOOK—DESIGN will expand the field of activity of the experienced engineer and increase his versatility by providing handy information on subjects allied to his specialty. Inexperienced engineers will find this book a valuable tool, eliminating costly mistakes by supplying design data developed by an eminent consulting engineer over a period of thirty-five years.

CONTENTS

Intensive structural sections (general, concrete, steel, wood, plywood, foundations) Soils, Earthwork, Roads, Railroads, Airports, Bridges, Transmission Towers, Dams, Docks and Piers, Corrosion of Metal, Athletic Fields, Drainage, Sewerage, Waste Disposal, Water Supply, Water Purification, Water Distribution.

NECESSARY DATA: The book gives all information necessary to design any of the ordinary civil engineering structures. Included are constants of nature, rules of practice, design formulas, details of engineering structures.

TIME- and LABOR-SAVING TABLES: Numerous tables are included, among them many original ones, such as curves for computing combined flexural and compressive strengths of reinforced concrete columns, etc.

ON APPROVAL COUPON

John Wiley & Sons, Inc.
440 Fourth Ave.,
New York 16, N.Y.

Please send me a copy of Seelye's DESIGN on ten days' approval. At the end of that time, if I decide to keep the book, I will remit $7.50 plus postage, otherwise I will return the book postpaid.

Name.....
Address.....
City and State.....
Employed by.....

C&EM-1-46

Index to Advertisers

Acme Wire and Iron Works 99
Aeroil Products Company 11
Agerstrand Corporation 58
Aircraft & Diesel Equipment Corp. 80
Alloy Steel & Metals Company 76
American Cable Division 50
American Steel Scraper Co. 69
Anchor Coupling Co., Inc. 63
Anthony Company 20
Ariens Company 40
Armco Drainage Products Assn. 58
Athey Products Corp. 8
Atkins and Company, E. C. 48
Austin-Western Company 63

Baker Mfg. Co. 24, 25
Barber-Greene Company 91
Barco Manufacturing Company 86
Barnes Manufacturing Co. 101
Barrett Division, The 56
Beebe Brothers 29
Bethlehem Steel Company 85
Bicknell Manufacturing Co. 9
Bin-Dicator Company, The 98
Blackhawk Mfg. Company 46
Blaw-Knox Division 36
Briggs & Stratton Corp. 38
Bucyrus-Erie Company 89
Burch Corporation 82
Butler Bin Company 40

Caine Steel Company 51
Calcium Chloride Association 38
Case Co., J. I. 67
Cataphote Corporation 90
Caterpillar Tractor Co. 16
Chicago Pneumatic Tool Co. 18, 19
Chrysler Corporation 12, 13
C. I. T. Corporation 21
Cleaver-Brooks Company 60
Cleveland Rock Drill Div. Cleveland Pneumatic Tool Co. 75
Cleveland Trencher Company 100
Clyde Iron Works, Inc. 47
Complete Machinery & Equip Co., Inc. 31
Construction Machinery Company 57
Continental Rubber Works 86
Cummer & Son Co., The F. D. 64

Davenport Besler Corporation 87
DeSoto Foundry, Inc. 62
Douglas Fir Plywood Assn. 55
Dreyer Vibrator Co. 94

Electric Steel Foundry 42
Electric Tamper & Equipment Co. 76
Embury Mfg. Co. 95
Erie Steel Construction Co. 87
Etnyre & Co., E. D. 102

Fawick Airflex Co., Inc. 31
Foote Co., Inc. 70
Ford Motor Co. 61
Fulton Bag & Cotton Mills 34

Galion Iron Works & Mfg. Co. 82
Gar Wood Industries, Inc. 73, 83
Gatke Corporation 17
GMC Truck & Coach Division 65
Grace Mfg. Co., W. E. 84
Griffin Wellpoint Corp. 73
Gulf Oil Corporation 45

Haiss Mfg. Co., Inc., George 28
Harnischfeger Corporation 98
Hauck Mfg. Company 14
Hayward Company 49
Heil Co. 71
Heltzel Steel Form & Iron Co. 32
Hercules Steel Products Co. 92
Hetherington & Berner Inc. 77
Highway Equipment Co., Inc. 91
Highway Steel Products Co. 79
Hobart Brothers Co. 96
Huber Mfg. Co. 11
Hyster Company 41

Industrial Brownhoist Corp. 38
Ingersoll-Rand Company 10
International Harvester Co. 68
International Vibration Co. 46
Isaacson Iron Works 57

Jaeger Machine Co. 15
Jahn Company, C. R. 46

Kelly Machinery Co. 20
Keystone Asphalt Products Co. 44
Klauer Manufacturing Co. 43
Koehring Company 80
Kotal Company 64

LaCrosse Trailer & Equipment Co. 44
Lansing Company 8
LaPlant-Choate Manufacturing Co., Inc. 26, 27
Le Tourneau, Inc., R. G. 104
Lewis Equipment Co., H. W. 56
Lidgerwood Manufacturing Co. 48
Linn Manufacturing Corp. 24
Lister-Blackstone, Inc. 79
Littleford Bros., Inc. 93

Madsen Iron Works 30
Mall Tool Company 103
Marion Metal Products Co. 28
Marion Steam Shovel Co. 33
Martin Machine Company 77
McCaffrey, Inc., M. P. 99
McCaffrey-Ruddock Tagline Corp. 71
McKiernan-Terry Corp. 92
Mechanics Universal Joint Div. 98
Michigan Power Shovel Co. 97
Mixermobile Mbnufacturers 7
Monarch Road Machinery Co. 67
Murphy Diesel Co. 72

National Production Co. 64
Naylor Pipe Co. 88
Novo Engine Co. 37

Oliver Corporation, The 74
Onan & Sons, D. W. 60
Osgood Company 95
Owen Bucket Co. 57

Page Engineering Co. 96
Parsons Company 84
Pettibone Mulliken Corp. 66
Punch-Lok Company 88

Rapid Pavement Breaker Co. 30
Rockford Clutch Division 58
Rodgers Hydraulic, Inc. 54
Roeth Vibrator Company 80
Rogers Bros. Corp. 62
Rosco Mfg. Company 28

Sargen Derrick Co. 15
Schramm Inc. 72
Seaman Motors Company 5
Servicised Products Corp. 101
Shunk Manufacturing Co. 74
Sinclair Refining Company 14
Smith Engineering Works 78
Smith Co., The T. L. 94
Standard Oil Co. of California 59
Standard Steel Corporation 35
Sterling Machinery Corp. 47
Sterling Wheelbarrow Co. 100
Sullivan Machinery Company 34
Syntron Co. 88

Templeton, Kenly & Co. 71
Texas Company, The 3, 22, 23
Thew Shovel Company, The 9
Tuthill Spring Company 81
Twin Disc Clutch Co. 102

Union Iron Works, Inc. 54
United Laboratories, Inc. 102
United States Motors Corp. 76
Universal Engineering Corp. 49

Vickers, Inc. 29
Victor Equipment Co. 35
Vulcan Tool Manufacturing Co. 10

Walter Motor Truck Co. 39
Warren-Knight Co. 83
Waukesha Motor Co. 96
Wellman Engineering Co. 32
White Mfg. Co. 50
Wiley & Sons, Inc., John 103
Winpower Mfg. Co. 51
Wisconsin Motor Corp. 100
Wooldridge Mfg. Company 81
Worthington Mower Company 90
Worthington-Ransome Constr. Equip. Div. 68, 69

Contractors and Engineers Monthly

SHOULDER FINISHING ...A JOB FOR TOURNAPULLS

Big low pressure tires protect new pavement. After handling this shoulder work, these Tournapulls were driven over highways to a land-levelling project, then to a stripping job. Self-powered moves—plus job versatility—are typical Tournapull advantages.

CHECK FACTS & FIGURES FROM THIS ILLINOIS ROAD JOB AGAINST YOUR RECORDS

PROJECT... O'Connor Construction Company's shoulder finishing job on U.S. Highway 66 by-pass north of Towanda, Ill. 30,000 yards to be moved to build up shoulders 2 to 3 feet along new concrete paving. Material clay. Long hauls from borrow pit, largely on pavement

METHOD... to handle the long, on-pavement hauls and shallow fills, four 15-heaped-yard Tournapulls loaded, hauled and spread total yardage at scraper-dirt costs.

PRODUCTION... time study showed average of 5.6 heaping loads delivered per hour by each Tournapull on 2-mile round trip. 200' haul out of borrow pit was up 6% grade, the remainder over new pavement. Each rig was push loaded to capacity in average of 1 minute, spread material along 75 feet of shoulder.

Tournapulls are particularly well adapted to work like this because they give: (1) high-speed hauling over pavement without slab damage, (2) fast loading in light cuts, (3) accurate, controlled spreading on shallow fills. These are a few of the reasons why the Tournapull method of moving dirt offers you definite cost-cutting advantages. See your LeTourneau distributor for more facts and figures.

CS8C

Tournapulls load hard clay in 1-minute average; one pusher serves all four rigs used on 2-mile round trip haul.

Loads are accurately spread along shoulder in thin or thick layers as needed. Motor grader handles final finishing.

LETOURNEAU
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

JOB-PROVED
Over 4000 Built and Shipped

TOURNAPULLS®
® Trade Mark Reg. U. S. Pat. Off.